"THE FAR EASTERN REVIEW" – CHINESE RAILWAY CONSTRUCTION

A COMPREHENSIVE STUDY OF HISTORICAL REFERENCES WITHIN THE LIFE OF THIS JOURNAL OF THE DEVELOPMENT & CONSTRUCTION OF CHINA'S EARLY RAILWAYS, INCLUDING EXTRACTS OF RELEVANT PAGES
(SECTION 11 of 14)

For Introduction please see preface to Volumes I - V

(Note : to view the relative pages of the magazine, scroll down to end of these notes for each volume, respectively)

Volume XXVII

January 1931
Drawing Lines on a Map – The Manchurian Railway Tangle An editorial by Editor, G.B Rea with his assessment of the railway building on profusely by the local governments, overlooking realities.
Building Manchuria's Railways An illustrated description of the railways being built in Manchuria, using American steel for the bridges. 1 sketch map and 4 photos of bridges.
The Kirin-Tunhua Railway. A well-illustrated article describing the construction of this new railway between Jilin 吉林 & Dunhua 敦化. 26 small photos.
Railways First – Progressive Chinese Railway Legislation A report that the Nanking government had drafted new railway laws.
Chikow – Shihkiachwang Railway A report that construction of this new line (Qikou 祁口 - *Shijiazhuang* 石家莊) would start shortly to link with the Peking-Hankow & Tienstsin-Pukow Railways.
Sulzer Diesel Locomotives A brief illustrated description of diesel locomotives being constructed for various Asian railways including railcars for the S.M.R.

February 1931
Railways First – An editorial about the Nanking government's proposed new railway legislation which attempts to balance interests between nationalized state railways and privately owned railways.
Chikow-Shihkiachwang Railway A report that construction of this new line would commence the following month.
Diesel Engines for the Far East A general report about diesel locomotives being built for various railways in the Far East. Includes a brief description of diesel rail cars and a shunting engine being constructed for the South Manchuria Railway.

Chaoyangchen Rail Line A report of a new line to be built from Chaoyangchen (朝阳镇) to Fushun.
Lunghai Railway Extension Construction of the Lingpao -Tungkwan (灵宝- 潼关) section was making progress.
Nanking Train Ferry- Sun Fo, the Minister of Railways had ordered that construction work be speeded up.

March 1931
Japanese Loan for the Kiukang to Nanchang Railway The Industrial Bank of Japan had made a loan of ¥1.5 million for construction of this line (九江 – 南昌). Also, a summary of Japanese loans to the South Manchuria Railway & other Chinese railways.
New Locomotives for Chinese Railways An illustrated article describing new locomotives supplied for Chinese railways, paid for by funds from the British "Boxer Indemnity Fund" , Multiple photographs and drawings of the new locomotives from the Baldwin, ALCO & North British locomotive companies.
4-6-0 Type of Locomotive for the Government of Hong Kong. An illustrated description of an engine built by the Kitson works for the Kowloon-Canton Railway & a shipment of 25 Skoda engines for the Mukden-Hailung Railway.
Recent German Locomotives for Chinese Railways Illustrated description of German (Orenstein & Koppel, Schwarzkopf , Henschel) and Belgium (Liege) locomotives recently supplied to China. This is followed by photos of Sentinel steam railcars supplied for the S.N.R , a CKD and a Borsig locomotive for the Liu Chang Coal Mine.
Motor Railways in South China Illustrated description of motor railcars for the Sunning railway. The bodies were constructed by China Motors of Shanghai using Dodge chassis imported from U.S.A.

April 1931
Progress on Chinese National Railways An article explaining how the Peiping (ex Peking) - Liaoning Line had split into two administrations during the civil war but following the "unification" of the nation again, the railway's administration had also reunited on 1st October 1929 with a Head Office in Mukden. This followed by a table of Government Railway Earnings for 1930 together with brief notes on updates concerning the various lines.

May 1931
Electric Power Development in Fushun An eight-page article primarily describing the development of the electric power station and sub-stations at the Fushun mines. However, this includes maps and paragraphs describing the electric railway tracks serving the various mine industries together with small photographs of electric locomotives.

June 1931
Hoover Doesn't Have to Explain Not directly related to Chinese railways but it is of academic interest because it involves the history of how the British seized financial control of the Kaiping mines, the origin of China's railway system. Herbert Hoover (31st President of USA) had originally been a mining engineer for Chinese Engineering & Mining Co. and it is in this position that he became involved in court proceedings in UK over ownership of the mines and for a brief period he was appointed their new Chief Engineer by the (mainly British) shareholders. The editor G.B Rea defends Hoover and dismisses as false, allegations at that time of corruption and betrayal of the Chinese shareholders.

Municipality of Canton A sketch map of new roads in Canton. The railway lines are depicted entering the city to separate termini on the West and East before the lines were connected.

July 1931
No Chinese railway related items

August 1931
Engineering Notes:-
To Place Big Order - Negotiations had begun with the South Manchuria Railway's workshops for a large order of rolling stock for use on the Shenyang-Hailun railway.
Railway Material for China The Purchasing Commission had started proceedings for the purchase of £3.5 million worth of railway equipment from Britain from the 1901 China Indemnity Fund.
Railway Receipts : Summary of earnings of the N.E Provinces' railways for July.
Buy's Railway Equipment : A duplicated report about the purchase of railway equipment from Britain

September 1931
The Only Railway in Szechuan : A brief illustrated history and description of the short 2ft.-gauge Peh-Chuan Railway (北川铁路) in Szechuan Province. This coal mine railway was about 60 miles north of Chungking (Chongqing). 8 photographs including a portrait of Danish Chief Engineer Jesper Shultz. (The line was demolished in 1968 but in 2019 plans were progressing to rebuild this line as a tourist attraction)
Three New Engineering Projects : Sunning Railway Bridge A short report about the progress of constructing a railway bridge across the River Tam (潭江) at "Kung Yet" (公益 *Gongyi* [the more usual rendering was "Kungyik])

October 1931
Long Distance Telephone Service - Hong Kong – Canton Included because this report shows cable laying along the track beds of the Kowloon-Canton Railway, making use of cable laying rail wagons and push carts.
More Work on the Lung-Hai Railway : An illustrated report about the construction the Lingpao -Tungkwan (灵宝- 潼关) section of the Lung-Hai railway extension. 1 sketch map & 3 photographs of wagons.
A Signal Achievement a description , including specifications , of four new Mikado Type locomotives built for Kiaochow-Tsinan Line by the SMR works. 1 photograph.

November 1931
Motor Rail Cars in China Short description of motor rail cars on use on the Sunning Railway feeder branch line & also petrol locomotives on the Shanghai- Chuansha & Shanghai-Nanhwei narrow gauge lines. 2 photos.
Railway Orders from China A short report confirming that orders for railway equipment had been placed in Britain.

December 1931
Railway Equipment Market in Manchuria Illustrated report about recent orders for railway locomotives and rolling stock for China's railways in the north. Several photographs.

The Mulin Coal Mine Kirin Short description of the Mulin coal mine and its associated railway in Mulin (*Muling* 穆棱) , Kirin (*Jilin*) Province.
Engineering Notes:-
To Explore Mines The Kiaochow-Tsinan Railway administration intended to exploit various coal mines along the railway route.
To Obtain Loan The South Manchuria Railway had obtained further syndicated loans of ¥16 million.
New Railway Bridges The Ministry of Railways had purchased several new bridges to replace old ones along the Peking-Hankow Railway.
Lunghai railway Opens Trains services were about to commence on the newly completed Lingpao –Tungkwan (灵宝- 潼关) extension

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THE FAR EASTERN REVIEW

上海黃浦灘念四號

遠東時報

THE

SKYWAYS OF ASIA

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Drawing Lines on a Map

The Manchurian Railway Tangle and What it May Lead To

By GEORGE BRONSON REA

MANCHURIA may be the most progressive and most prosperous part of China, but its Government certainly needs pepping up in publicity methods. If our advice is worth anything, we would suggest that the Mukden authorities advertise for the services of a Publicity Director or Propaganda Expert, one familiar with Manchurian geographical and place names, able to wield a road-pen and draw straight, parallel, crooked and curved lines on a map and above all preserve a sense of humor. This advice is gratuitous, cheerfully extended in order to save ourselves and other editors from a mental breakdown trying to verify and keep up with new railways projected for Manchuria by some one who obviously spends his nights drawing lines on a map and his days in spreading reports about the new railways that are to be built by the Northeastern Communications Commission.

Now we do not object to drawing lines on a map. It is an innocent pastime and we used to be rather good at it ourselves, but we were always careful to draw a line that would not create trouble for our Chinese friends by conflicting with their existing treaties, agreements or commitments. But these bright boys in Manchuria wot not of treaties and seemingly care less. After all, China is a sovereign state, Manchuria is Manchuria and the old treaties are all unequal. Anyhow, its up to Nanking to worry about foreign relations.

The Manchurian Board of Railway Strategy gathers around a big base map with an assortment of sharpened pencils and proceeds to business. The result is a beautiful example of artistic map drawing and we reproduce herewith the complete masterpiece. But this is not all. There is a Secret Military Map, locked up in the safe of the Manchurian General Staff, on which appear several additional strategic lines following the Russo-Chinese border, designed against the day when "Tovarish" Stalin and his Soviet cronies start any more monkey business with the Chinese Eastern Railway.

These introductory remarks may seem flippant and undignified but it is better to approach the subject from the humorous side than to take it seriously. For the past year or so there has been a steady flow of reports from Mukden concerning the building of new railways in Manchuria, until the total runs to over fifty-eight separate lines with an aggregate length of 7,500 miles to cost over $200,000,000. One gathers the impression that somebody in Manchuria is trying to emulate Dr. Sun Yat-sen by devising a system of railways that will connect up every city, town and village in the Three Eastern Provinces and take all the money that China can raise in the next few decades to build them. They may not like Dr. Sun's political principles in Manchuria, but they have grabbed his economic publicity ideas and gone him one better.

Most of these reports as published in the newspapers, are purported to be based on official information, in fact, several of the most important and all embracing projects were announced as the official program of the Northeastern Communications Bureau. When these reports bear the stamp of official approval and no attempt is made on the part of the authorities to correct or deny them, it is no wonder that they cause anxiety in Japan. It is not necessary to go back over a long period to review these reports. We take at random only a few of the most prominent published during the last four months :—

(1) On September 13, it was announced that the *Northeastern Communications Commission* had drawn up a scheme for the construction of ten branch railway lines in the next seven years. The cost, estimated at $15,000,000, was to be borne equally by the three Manchurian provinces and Jehol, and the various Manchurian railway administrations were to supply the balance. Engineers and surveyors were to start to survey this spring.

(2) On October 29, the report came from Mukden that the *Northeastern Communications Commission* had worked out a special railway construction program, covering 12 new lines, to cost $90,000,000, of which sum $40,000,000 was to come from foreign sources and the balance raised by special taxes on industry and commerce.

(3) On October 30, it was reported that the *Northeastern Communications Committee*, had instructed all Chinese railways in Manchuria to reduce their freight rates on export goods which were usually carried by the S.M.R. and to co-operate closer with the Peking-Mukden line.

(4) November 21 : *The Manchuria Daily News*, usually well informed on Manchurian affairs, published a news item to the effect that Marshal Chiang Hsueh-liang was accompanied on his trip to Nanking by a large staff of railway engineers and had received the consent of the National Government to several of his railway schemes in Manchuria, and that his plans would be put into immediate execution.

(5) December 3 : The *Northeastern Communications Commission* is reported as being engaged in a close study of the existing Sino-Japanese treaties as preliminary to drafting a plan for a new network of railways for Manchuria.

(6) December 10 : A Rengo dispatch from Mukden says :—

"Construction of new railways has apparently gripped the imagination of the Manchurian authorities. The building program recently approved by the *Northeastern Communications Commission* comprises 56 lines with an aggregate mileage of 10,000 kilometers. According to the scheme, the new lines to be constructed in South Manchuria will be between Taonan and Jehol, between Tiehling and Fakumen, between Kungehuling and Itungchow, and between Hsingching and Linkiang."

(7) December 12 : (Report from Mukden) The *Northeastern Communications Commission*, announces the plans for the construction of three railways this spring to cost $90,000,000. The proposed lines include :

(1) Tungliao-Heiho in Heilungkiang passing Taonan and Tsitsihar.
(2) Kirin-Mulin-Itan in Kirin.
(3) Hulutao-Urga, starting from Hulutao through Jehol and on into Mongolia to Urga.

(8) December 16 : The chairman of the *Northeastern Communications Commission*, is reported to have submitted a concrete plan for constructing the following three lines for national defence :

(1) The Tsitsihar-Heiho (Aigun) Line ..	800 li, cost	$20,000,000
(2) Tungkiang-Ilan Line	400 ,, ,,	10,000,000
(3) Fushun-Kaiping Line	300 ,, ,,	10,000,000

A glance at the map, will disclose that the line from Fushun to Kaiping not only parallels the S.M.R. but a short extension will bring it to the port of Newchwang. Furthermore, on November 28, the report was published that the *Northeastern Communications Commission* had completed all arrangements for constructing four highways this year in Manchuria, one of these being a highway from Kaiping to Fuchow, a junk port in the Liaotung peninsula, adjoining the Leased Territory border, another outlet for the proposed Fushun-Kaiping Railway.

(9) December 15 : *The Manchuria Daily News* published the full list of projected Chinese lines for Manchuria, as follows :—

"Of the multitudinous new railways planned by the *Northeastern Communications Commission*, Mukden, which are said to number more than 200 for the four Northeastern Provinces, what

seem to have a chance to assume form are put at 50 odd, a list of which follows " :—

	Distance (Kilometers)		Distance (Kilometers)
Kirin-Wuchang	162	Ninguta-Hailin	23
Harbin-Ilan	308	Mango-Chaotung	35
Chaoyangchen-Antu	358	Liaoyang-Lichiawopu	86
Heiho-Lintien-Anda	112	Chihfong-Linsi	270
Taonan-Jehol	888	Mango-Hsinglungchen	88
Changchun-Talai	212	Muling-Sanhsing	265
Tsitsihar-Peture	248	Tehui-Chiutai	45
Hsiaochio-Lintien	27	Imienpo-Wuchang	97
Hulan-Hulikang	463	Imienpo-Ilan	225
Hailun-Nenkiang	270	Hailannor-Solun	480
Kungchuling-Itung	57	Shihtouchengtzu-Yuchan	64
Tiehling-Fakumen	56	Yenchi-Hunchun	95
Panshan-Tahushan	240	Tungpin-Wuchang	165
Hsinlitun-Hsinchiu	48	Hsinchiu-Linhsi	(distance unavailable)
Anda-Paichuan	175	Tsitsihar-Nenkiang	,,
Linkiang-Antung	275	Tunhua-Wuchang	,,
Hailin-Chingpohu	138	Muling-Mutankiang	,,
Mishan-Fuchin	288	Harbin-Heikang	,,
Fuyu-Harbin	218	Mishan-Hulin	,,
Kailu-Linhsi	345	Kirin-Ninguta	,,
Kaitung-Fuyu	148	Mukden-Jehol	,,
Shenyang-Liaoyang	80	Chaoyangchen-Mongkiang	,,
Changwu-Chengchiatun	28	Tachiakou-Tahochuang	,,
Kirin-Hulan	208	Sanhsing-Imienpo	,,
Mango-Chingkang	92	Fuhsin-Lichiawopeng	,,
Yaomen-Tehui	22	Ssupingkai-Takata	,,
Lingkiang-Changpai	184		
Hsingking-Linkiang	320		

(10) December 26: *The Manchuria Daily News*, says that: "The Chinese new lines under project, work on which is to be commenced next spring as the first stage programme of the railway network for the Northeast, comprise:—

(1) Kirin-Wuchang.
(2) Mukden-Liaoyang.
(3) Mukden-Jehol.
(4) Ssupingkai-Takata.
(5) Harbin-Ilan.
(6) Taonan-Jehol.
(7) Tiehling-Fakumen.
(8) Panshan-Tahushan.
(9) Linkiang-Antung.
(10) Yenchi-Hanchun.
(11) Tsitsihar-Heiho.
(12) Harbin-Heiho.

"*The Northeastern Communications Commission* is declaring that engineers will be despatched shortly to the respective routes to carry out necessary surveys."

After such a brilliant exploit of building railways in the air, it might be supposed that the Manchurian Board of Strategy would rest a while from it's labors. But no, on January 6, we were informed that the indefatigable *Northeastern Communications Commission* had decided to start immediate construction of a line between Chihfeng and Chaoyang to develop the Jehol hinterland. Chihfeng would become the railway center for lines linking it with Jehol, Dolonor, Linhsi, Kailu and Chaoyang. The cost was only an insignificant $50,000,000.

It is to be noted that most of these reports emanated from Mukden during the absence of the Young Marshal who, as the Japanese affirm, was accompanied on his visit to Nanking by a group of railway experts and engineers in order to impress upon the National Government the urgent necessity of approving his program. These facts lead to the suspicion that the flood of reports concerning the activities of the *Northeastern Communications Commission* were circulated either to support the Young Marshal's diplomacy, or in his absence some enthusiastic subordinate "spilled the beans" as to the official program.

It is no wonder that the Japanese began to sense that something was happening behind the scenes that boded no good to the S.M.R. The Japanese newspaper correspondents unearthed the details of an alleged secret understanding between Marshal Chang and Nanking and reported it to their home offices. The whole program is so fantastic, so rabidly anti-Japanese, that taken in connection with the agitations of the past few years, it gave rise to considerable anxiety.

This alleged policy as published in the *Osaka Mainichi* lays down the following formula:—

"1. That the Chinese educational system shall be improved in such a way that anti-Japanese sentiment shall be permanently inculcated in the people. (*This is nothing new. It has been going on for some years*). 2. Friendly relations shall be established with Russia in so far as Manchurian issues are concerned, and to facilitate this, all pending issues between the two countries shall be settled at once. 3. Port and railway improvements in Manchuria will in future be carried out solely by China and Japan will be given no more concessions. A railway policy to be devised that will eventually compel Japan to surrender the South Manchuria Railway at a low price. 4. All diplomatic issues between Manchuria and Japan to be transferred to Nanking so that their settlement can be delayed as long as possible. 5. All Manchurian debts to Japan to be transferred to the Ministry of Finance at Nanking. 7. A boycott of Japanese goods to be conducted and the economic independence of Manchuria established. 8. Withdrawal of the Japanese garrisons stationed in North China as well as the railway guards in the S.M.R. zone. In case these demands are not complied with, anti-Japanese agitations are to be started."

Ordinarily, such a provocative program would be maintained a profound secret and its publication regarded as the vaporings of a disordered newspaper mind. Unfortunately, however, every item of news that comes out of Manchuria and even some from Nanking tends to strengthen the above report. Even the official bulletin of the Ministry of Commerce, Industry and Labor, publishes the story that the Government is planning to redeem the three Manchurian railways built with Japanese capital as a step towards eliminating Japanese influence and depriving the S.M.R. of essential feeders whose traffic would then be diverted to the main Chinese lines. The *Jiji* correspondent at Nanking learns that the Executive Council has instructed the Foreign Minister to demand from Japan the recession of the great Fushun Coal Mines in order to incorporate them in the state monopoly now under consideration. On sale in the Chinese bookstores in Mukden is a highly colored lithographed map of Manchuria, showing over fifty proposed railways, displaying in large type, the name of Marshal Chang Hsueh-liang. And so it goes. All these reports were given out as official propaganda of

Building Manchuria's Railways

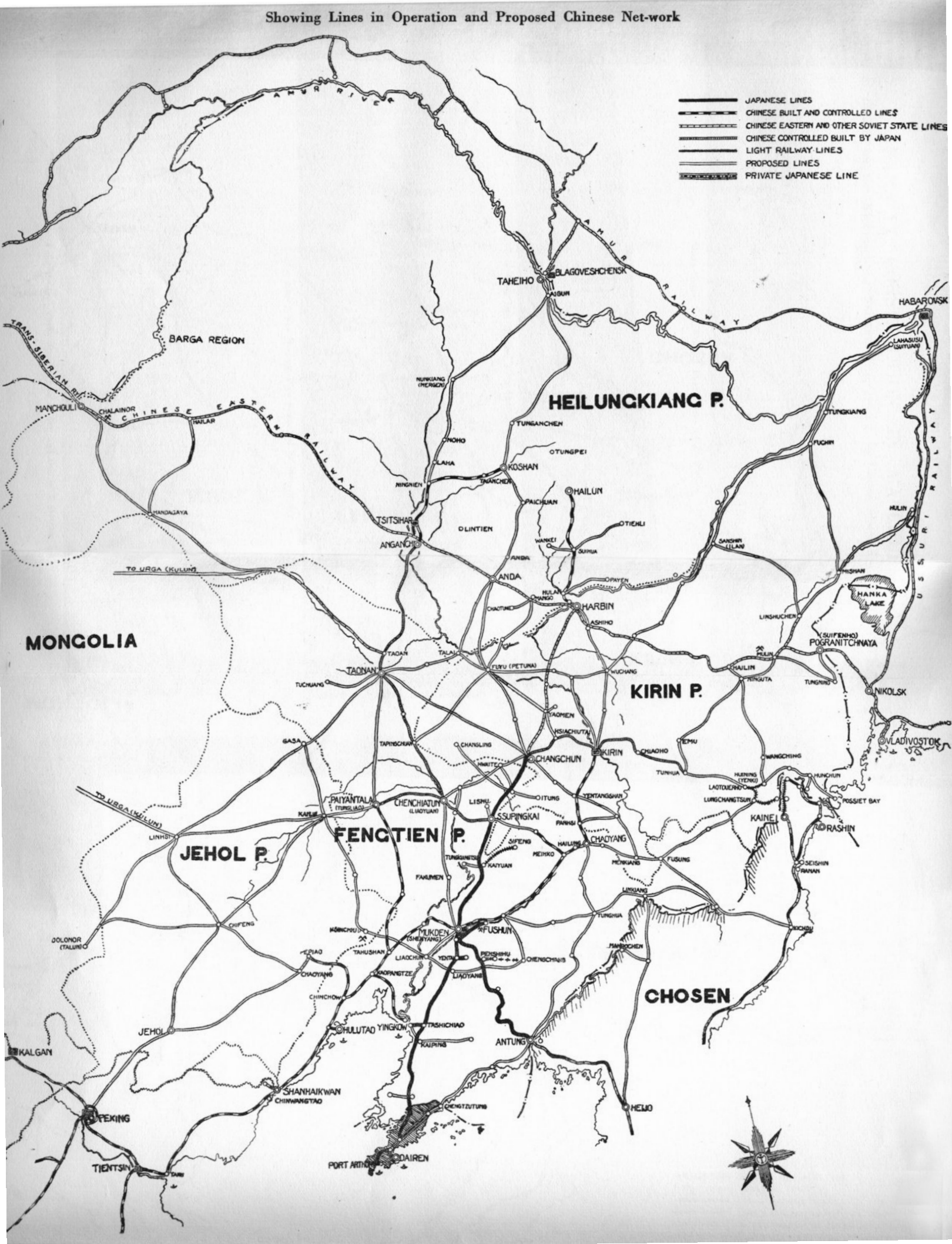
American Steel for the Kirin-Heilung Railway Bridges

We reproduce on Page 11 several illustrations of the types of bridges on the Kirin-Heilung Railway, furnished to the Manchurian railway authorities by the United States Steel Products Company through the well-known firm of Andersen, Meyer & Company, Ltd. During June 1928, a contract was signed by the above parties for the supply of 244 bridges, 33 being deck plate girder spans, 14 through plate girder spans and the balance single and double beam spans. The total contract price was G$132,300.

The bridges were fabricated by the American Bridge Company at their Baltimore plant, the total weight of materials on this contract being 3,335,000 lbs. The order for these bridges was entered with the American Bridge Company toward the end of July, 1928, and the first lot was shipped on September 16, on the Isthmian Steamship Company's vessel, the s.s. *Steel Inventor*, or within eight weeks after receipt of order, completion of detailed drawings and assembly of fabricated material. The second lot of bridges cleared on the s.s. *Bessemer City* on October 18, or about four weeks after the first lot, an indication of the prompt dispatch offered by this company for the supply of heavy fabricated material to Chinese railways.

The four photographs show the installation of some of these structures, which are also indicative of the excellent engineering work performed by the Chinese engineers who had charge of their erection. In addition to the supply of bridges, the United States Steel Products Company furnished to this railway, 21,000 tons of both 80 lb. and 60 lb. rails, at a contract price of nearly G,$1,000,000. The order for these rails and switches was obtained at the end of November, 1927, and shipment from mill commenced at the end of December, or within four weeks, and they were delivered at Dairen, two months afterwards. This typical Chinese railway in Manchuria built entirely with Chinese money and by Chinese engineers, was practically equipped throughout with material of the United States Steel Products Company supplied through Andersen, Meyer & Company.

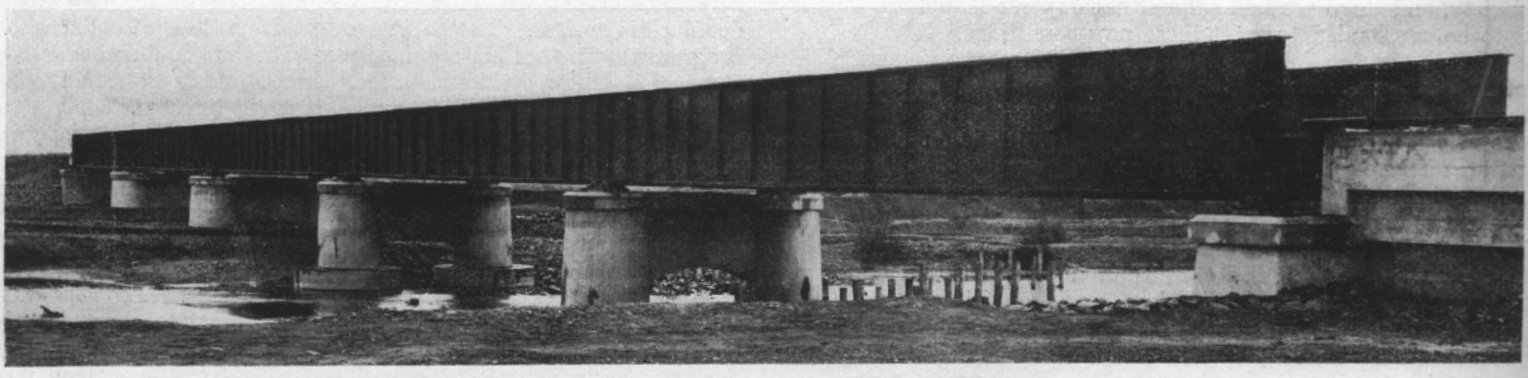
Showing Lines in Operation and Proposed Chinese Net-work



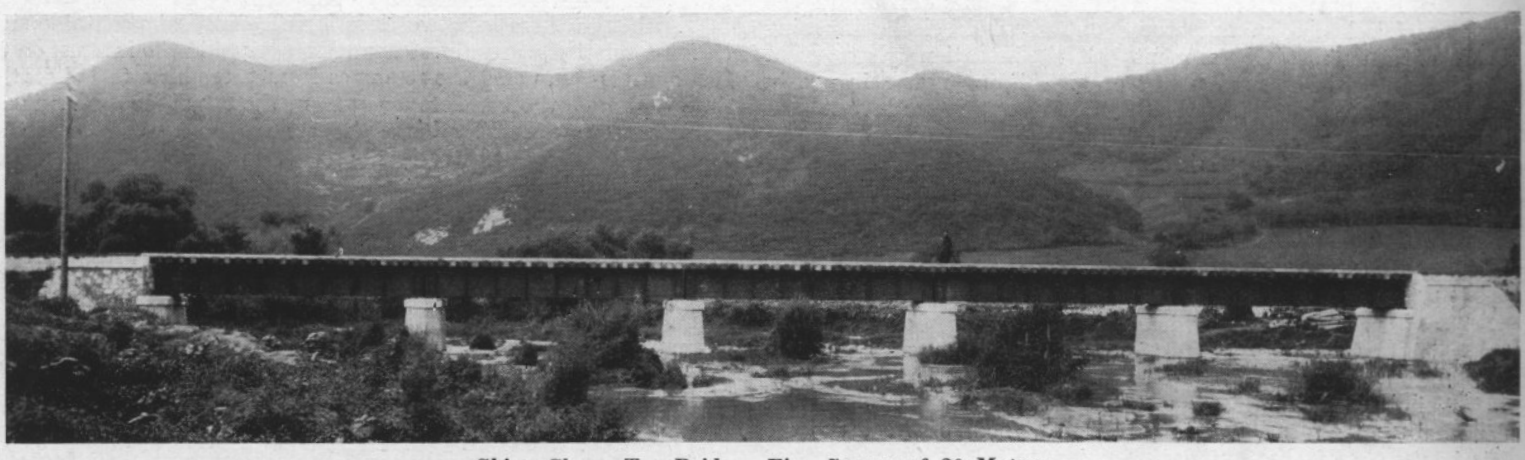
RAILWAY CONSTRUCTION IN MANCHURIA

Types of Bridges on the Kirin-Heilung Railway: Supplied by the United States Steel Products Company

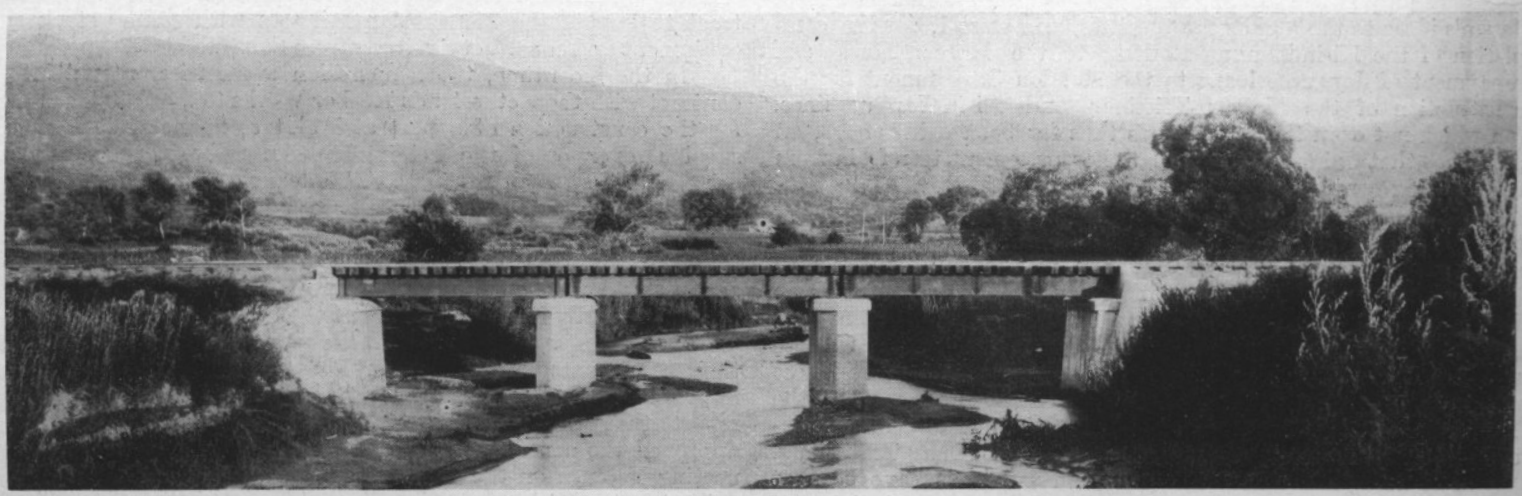
Shiao Cheng Tze Bridge: Four Spans of 20 Meters



Yen Tung San Bridge: Five Spans, of 20 Meters



Shiao Cheng Tze Bridge: Five Spans, of 20 Meters



Hsi Yang Bridge: Three Spans (Two of 6m. and One of 5 Meters

the *Northeastern Communications Commission*, and the colored map bears the stamp of official approval. No attempt was made to deny or rectify these statements until it seemed that the Japanese Government might ask for an explanation. Faced with this possibility, official spokesmen for Mukden declare that most of these lines originated in the minds of irresponsible Japanese newspapermen; that the map bearing the name of the Young Marshal is unreliable, published by private interests without the sanction of the Communications Commission; that even the official information on Manchurian railways contained in the *Chinese Economic Bulletin* issued by the Nanking Government, is inaccurate and misleading.

The outside world will perhaps never know what understanding was arrived at between the Young Marshal and the National Government on his recent visit to Nanking. The Japanese newspapers, however, are unanimous in that an agreement was reached whereby all diplomatic questions concerning Manchuria should be handled by Nanking and that a strong anti-Japanese policy should be inaugurated to drive Japan out of Manchuria. The publication of these reports in Japan, supported by the flood of railway propaganda originating in Mukden, caused alarm and anxiety, and there are indications that Japan's Manchurian policy is to be overhauled to meet these new conditions.

When the first report of the Young Marshal's understanding with Nanking reached Japan, the Japanese press announced on the authority of the Foreign Minister that no matter what agreement was arrived at between the heads of the two Chinese factions in regard to Manchurian affairs, Japan would continue to deal direct with Mukden in all matters concerning railways and other rights acquired by treaties and agreements signed by the Manchurian authorities. The Japanese Government would not permit the Young Marshal to evade his responsibilities in these matters by handing over to Nanking the existing obligations to Japan without consulting her.

For over a month, responsible Japanese officials have been endeavoring to allay the fears created by the newspaper reports of the Chinese program in Manchuria. The Chinese Minister at Tokyo called on Foreign Minister Baron Shidehara and denounced the stories as falsehoods, manufactured out of whole cloth, affirming that the Nationalist Government had no intention whatever of adopting an anti-Japanese policy or of building new railways in Manchuria that would injure the S.M.R. Nanking also hastened to declare the stories false. Baron Shidehara, in answer to questions put by his cabinet colleagues, preferred to believe that Nanking and Mukden were anxious to remain friendly with Japan and to work with her. He preserves a calm, statesmanlike grasp of the situation. Official Japan is extremely reticent, correct, and hopes for the best, doing nothing nor saying anything that could excite the slightest criticism.

There are certain facts which no official negation can set aside, and which have undoubtedly decided Tokyo to demand a friendly show-down in order to avert serious complications. China's railway projects in Manchuria are apparently more than a mere blue print menace to Japan. Mr. E. Kimura who resigned as Director of the Asiatic Bureau of the Japanese Foreign Office to take over the duties of Director of the South Manchuria Railway Company in charge of its political affairs, has been instructed to communicate Japan's ideas to the Mukden authorities, and press 1, for the completion of the Kirin-Tunhua Railway to the Korean border; 2, repayment of Japanese loans to the Mukden Government for the construction of the Taonan-Tsitsihar and Kirin-Tunhua lines, (on which not even the interest has thus far been paid) and 3, an assurance that China will not violate her agreement to refrain from constructing parallel lines competing with the S.M.R.

Press dispatches from Tokyo dated January 12, to the effect that Mr. Kimura would open negotiations on February 10, on the return of the Young Marshal to Mukden, was followed on the 14th by the announcement that the Young Marshal would remain in Peking and his uncle, Marshal Chang Tso-hsiang would assume full charge of Manchurian affairs. This sudden shift in the Chinese political line up, however, will make no change in the Japanese program for a settlement of Manchurian railway problems. If the Young Marshal is not to be the head of affairs in Mukden, negotiations will be conducted with his uncle, General Chang Tso-hsiang.

It is no secret that the Manchurian war-lords have been at loggerheads over the building of new railways, each provincial ruler doing his best to build and control lines that open up disputed territory and divert to his own treasury the revenues of his rivals. A glance at the map will show that the whole trend of the proposed construction program is to attract all the traffic from north and east down over the lines of the Mukden Government to the deep-water harbor under its control. This means that all the produce exported from Kirin and Heilungkiang, as well as all the goods imported from abroad for the consumers of these regions, must pay tribute to Mukden. The interests of the people of Kirin and Heilungkiang would be immeasurably advanced by the completion of the Kirin-Tunhua line to the Korean border, where they would have easy access to a deepwater outlet in close contact with their best customer and the nation which supplies them with the bulk of their manufactured requirements. Nationalism and patriotism as expressed in anti-Japanese agitation may be profitable for the Mukden oligarchy but the people of Kirin and Heilungkiang must pay the bill. Now, it is just possible that General Chang Tso-hsiang, having the best interests of his own bailiwick at heart, may be much more ready to agree to Japan's request to extend the Kirin-Tunhua line to the Korean border than his nephew and his Mukden advisers. General Chang Tso-hsiang, while just as patriotic as his nephew or Nanking, is also a very shrewd business man, with many personal investments that are being rendered worthless unless the railway deadlock is broken. The Kirin overlord is not likely to adhere to a program that makes his province pay tribute to Mukden and there is reason to believe that when Mr. Kimura and he get together on these matters, they will find a way out of the impasse.

Japan's position is reasonable and understandable. Japanese initiative, brains, and money, poured into Manchuria, created its industries and developed a market for its products. The Chinese, it is true, contributed their share, but the prosperity of the Three Eastern Provinces was made possible by the enterprise of the people who developed its resources and whose presence has been a guarantee of peaceful and stable conditions. The Japanese advanced the funds to the Chinese Government to construct the Kirin-Changchun and the Tsupingkai-Taonan railways. They then built the Kirin-Tunhua and the Taonan-Anganki lines, supplying the funds and equipment, and handing the completed lines over to the Mukden Government for operation.

Although these last two lines have been most profitable since their completion, the Chinese have not even paid the interest on the funds advanced, using the revenues from these lines to build other lines that take the business away from the Japanese S.M. railway. The Mukden authorities have also conducted a steady campaign to interest foreign capital in financing its railway and industrial schemes, openly advertised as being designed to strangle Japan's economic interests in Manchuria. A year and a half ago, representatives of Stone and Webster, of New York, arrived in Mukden to arrange for the financing and construction of the Solun-Manchuli and other lines, to be paid for by the bonds of the Mukden Government. When these negotiations collapsed, Mukden turned to the Germans and endeavored to interest them in a $50,000,000 loan to build several new railways in Manchuria based on the port of Hulutao. These plans also fell through. The Young Marshal it is reported then entered into negotiations with "a British capitalist" to establish a bank at Mukden with a capital of $30,000,000 to finance his railway schemes, and coincident with this report came the rumor that the Skoda Works of Prague had signed a secret contract to supply the Manchurian railways with rolling stock and equipment and construct a railway from Solun to Urga.

In the meantime, the Manchurian authorities entered into a contract with the Netherlands Harbor Works Co., a Dutch concern, for the construction of a port at Hulutao, financing it from the surplus revenues of the Peiping-Mukden railway, previously set aside as security for certain British loans. The British Government formally protested against this violation of agreement, but the work proceeds nevertheless. The Chinese have proceeded with their railway construction plans by utilizing their own funds as far as possible, creating a system of Chinese owned lines that must eventually impair the valve of the S.M.R.

It may be true that the Chinese have no intention of violating their agreements with Japan, but they are certainly creating that impression. Every news agency in Manchuria has circulated the report that the *Northeastern Communications Commission* has approved the construction of a short line, fifteen miles long, connecting Yaomen on the southern section of the C.E.R. with Hsiachiutai on the Kirin-Changchun line. The cost is put at $3,000,000 (silver) and work is to be started in February of this year. The S.M.R. derives a good share of its freight from the C.E.R. southern

district, and any interference with this source of revenue will seriously affect its prosperity. A glance at the map will show that the line is obviously designed to deprive the S.M.R. of this traffic and divert it to the Chinese Kirin-Changchun and down the Kirin-Hailung-Mukden lines to the Peking-Mukden and the port at Hulutao. It is also reported that the Yaomen-Hsiachiutai link will be extended on to Petuno, thus effectively nullifying the right conceded to Japan to build a railway into this region from Changchun to Taonan.

The Chinese have also projected a line from Harbin to Kirin, with two or three other connecting links between the Kirin system and the C.E.R. In the meanwhile, they are buying rolling stock, bridges, rails and other equipment in large quantities from America, Great Britain, Germany and Czecho-Slovakia, paying for the material from the profits of the existing lines. Further details of thi situation are hardly necessary in order to understand Japan's uneasiness.

Japan has an agreement with China to extend the Kirin-Tunhwa line to the Korean border, where it will link up with the Korean State Railways and a deep water port at Seishin. Confident that the Chinese would live up to their bargain, the Japanese advanced the funds and built the Kirin-Tunhua line for the Chinese, only to be told after they had completed the task, that under no consideration could the line be extended beyond Tunhua. Instead of repaying Japan for the two railways built for them, the Chinese not only have not paid the interest on the loans, but have used the profits of these railways to purchase materials from other countries and to build new lines designed to destroy Japan's investments in Manchuria.

Notwithstanding the official denials from Nanking and Mukden that there is no foundation to the reports circulated concerning the anti-Japanese understanding, the Japanese press agencies continue to assert the contrary. A *Dentsu* dispatch from Peiping, dated January 8, says :

> "In the face of Marshal Chang's flat contradiction that the railway net-work plan in Manchuria-Mongolia is all a hoax, the Northeastern Communications Commission headed by Director Kao of the Peiping-Mukden line has completed a study on how to materialize the plan which is now ready for execution."

Either the Japanese newspaper agencies are extremely gullible and accept every rumor as fact, and are carrying on a campaign to arouse their people against China, or there is something wrong with Mukden's publicity methods.

Japan apparently is no hog. She does not object to the building of new lines, providing they do not parallel too closely with the S.M.R. or deprive it of its revenues. Japan is willing to assist China in developing Manchuria, either alone or in co-operation with other nations, but insists that there must be some recognition of her rights as conceded in past treaties and agreements and a more faithful observance of obligations incurred. Japan is willing to make sacrifices in order to arrive at an equitable and amicable adjustment of these questions that will permit both nations to co-operate harmoniously for the development of Manchuria, and Mr. Kimura has been instructed to bring these issues to a head in a friendly pow-wow with Mukden. The result of the pending negotiations will be awaited with interest, as upon a favorable solution of these problems depends not only the future of Manchuria but the security of Japan. The menace of Soviet Russia in the North is assuming such alarming proportions, that if Japan does not succeed in arriving at some understanding with Mukden, while there is yet time to fortify her position, the consequences may be disastrous for both nations.

The National Government of China in its present bankrupt condition can obtain no financial assistance from abroad for railway construction. Neither can Mukden. The only hope for China to strengthen her defenses in the Northeast is through some amicable understanding with Japan, whereby the S.M.R. can raise the funds and build the railways vitally essential to the security of both nations.

That Silver Loan

(Continued from page 8)

no work, no security, no guarantees of life, no hope—nothing. And why ? Simply because there is no government that exercises any authority outside certain restricted areas. All the wealth of China is now concentrated in Shanghai, driven into the safe precincts of the International Settlement to escape confiscation by the ever-hungry war-lords and the ravenous tax-collectors of Nanking. If two hundred million ounces of silver were dumped into the interior of China to-day, it might bring temporary relief to some millions of destitute Chinese, but it would all gravitate in a few months back into Shanghai to swell the hoardings of the Chinese war-lords and their henchmen.

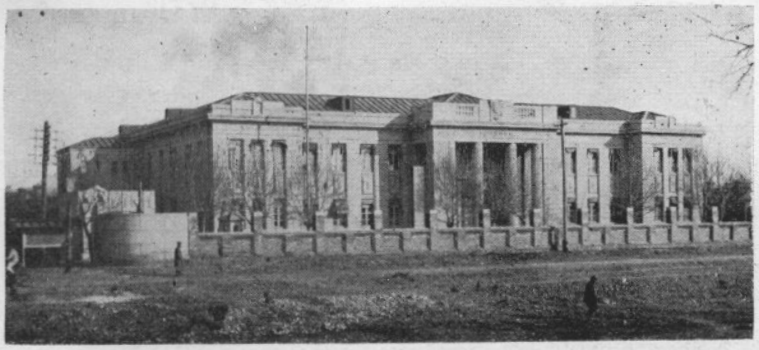
The following editorial from the *Shanghai Sunday Times* of January 25, so fully reflects our own thoughts on the proposed silver loan, that we reproduce it in full :

"The latest information from Nanking and Washington enables us to form a better understanding of the situation in regard to the proposal that the United States should lend China a thousand million ounces of silver than was possible during the past week, when we were deluged with contradictory reports. It is now clear that strong divergent opinions are held in China on this matter, and that, while the State Department at Washington knows nothing of the proposed silver loan, certain American interests are investigating its feasibility, being keenly desirous of finding a profitable market for so much surplus metal. Mr. Hu Han-min's warm advocacy of the proposed loan points to the Chairman of the Legislative Yuan being either the originator of the scheme advanced by Mr. Linebarger, a Nanking adviser now in the United States, or his backer in China, despite the Finance Minister's "no new loan" policy. On the other side of the Pacific there is a small body in Salt Lake City, composed of minor silver producers—large producers are not involved—and a few local politicians, which discerns in Mr. Linebarger's proposal a profitable means to relieve the American market of a substantial quantity of silver at this time, with the prospect of it being returned fifty years hence, long before which date it is confidently expected the present chaos in the economic world will have passed in favor of stability.

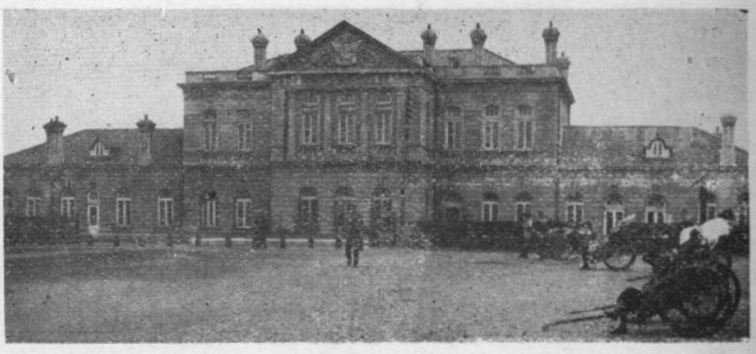
"Readers will no doubt have been somewhat amused by the proposed terms of the silver loan Mr. Hu Han-min set out. It is hard to believe that any lender would entertain them for one moment. Mr. Hu specifically states that the loan 'shall be made by the United States Government to the Chinese Government for constructive projects and the development of Sino-American commerce.' This is very attractive. But a further influx of silver to China now would ruin trade. Further, the American Government has no knowledge of the present loan proposal, and no American loans are granted these days without the prior consent of the State Department in Washington. Moreover, we have abundant evidence that the State Department is convinced of the absolute folly of shipping more silver to China at this time, so that it is not only unlikely that the Government will now, or in the near future, make the loan itself or consent to any American group doing so. The second article of the proposed loan agreement as stated by Mr. Hu, says that the one thousand million ounces shall be handed over to China in five equal instalments, the first of which is to be made in July next. Mr. Hu appears to presuppose that the United States Congress will put aside its not altogether unimportant tasks in order to render China what many able men both here and in the United States believe would be a singular disservice. In order to put through this transaction the American Government would require to obtain the authority of Congress, which could not be done in ten minutes. First, a Bill to cover the loan would have to be introduced into committee ; then, after discussion in the Senate, it would have to go through the many stages involved in Lower House procedure. Inasmuch as no steps have yet been taken, it is not easy to see how Mr. Hu can expect some of the silver at Nanking by July. The third term of the loan sets out that interest shall be at the rate of two per cent the period to be fifty years, but that after 1941 the Chinese Government may redeem the loan either by silver or gold payment as it seems fit. To cap these liberal conditions, the next article declares that there shall be no security for the loan. After this it is not surprising to learn that a joint commission consisting of representatives of the Chinese and American Governments shall be formed to supervise the use of the loan, while a special bank may be established for its management. It scarcely needs to be stated here that this is contrary to all tendencies in China to-day and to the policy of the Finance Minister.

"Now what is to become of this silver loan ? Mr. Hu tells us that it will not cause a further drop in silver value, but as it

(Continued on page 34)



Administration Office of Kirin-Changchun and Kirin-Tunhua Railways



Kirin Station

The Kirin-Tunhua Railway*

By L. I. LUBIMOFF

Of all the railway lines in Manchuria, particular attention is being centered on the new Kirin-Tunhua Railway, the construction of which was finished by the end of 1928, and which is an eastward extension of the Kirin-Changchun Railway.

The particular interest manifested at the present time in these Manchurian railways on the part of both Chinese and foreign circles is prompted not only by their importance for colonization, but also, in the first place, by the rôle which in future they will have to play in the general transportation problem in Manchuria, in respect to the direction taken by the exports and imports of the country.

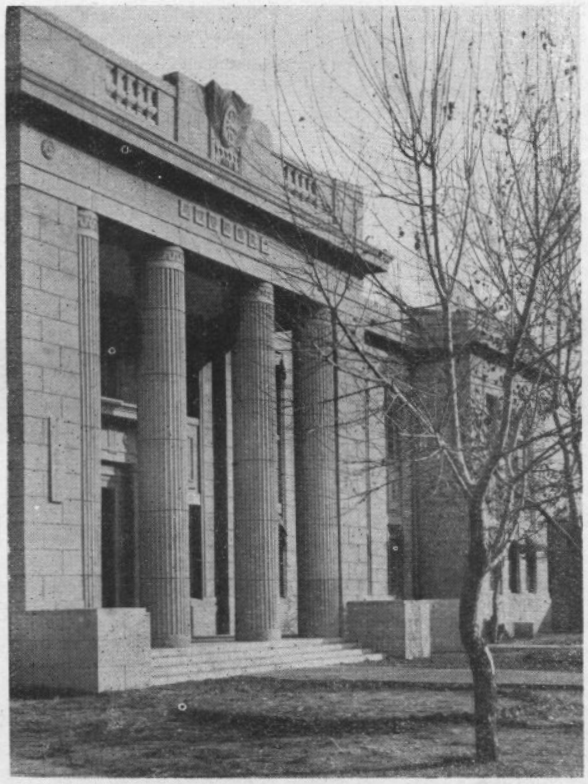
Upon the construction of the Kirin-Tunhua Railway, which it is proposed in the course of the next years to extend further to the east—to connect with the Korean system of railways on the Korean border the ultimate design being to create a new trunk railways with an exit at the ports of North Korea—(Seishin, Rasshin or Yunghuei). In respect to distance, the new trunk line, which in this article will be called the Kirin-Korean railway line, will represent the shortest outlet to the sea for Manchurian goods. Owing to the last mentioned circumstance, there is no doubt but that the contemporary transportation situation in Manchuria will suffer a radical change upon the completion of the new line.

The new line will be able to canvass an overwhelming quantity of Manchurian goods owing to its great advantages against other lines and routes, and this points to the great importance which it will acquire in the general transportation situation of the country.

The present article is devoted to this newly projected railway trunk line.

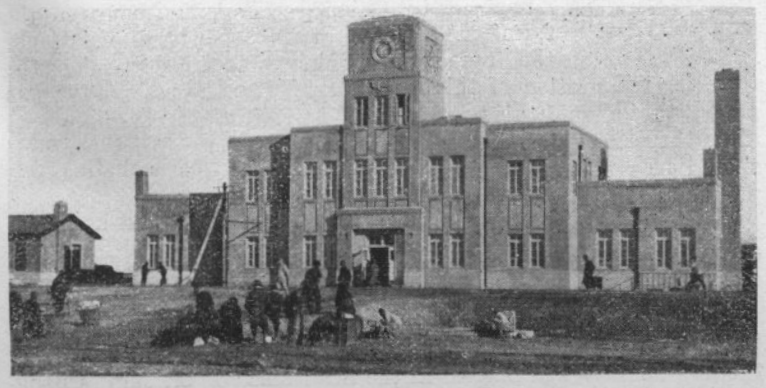
The construction of the Kirin-Tunhua Railway was carried on with very close co-operation on the part of Japan. As far back as 1909 an agreement was entered into between Japan and China regarding the frontier district of Chientao (districts of Tunhua, Yanchi, Holung, Wanching, etc.) over which there was dispute between the two countries. One of the articles of this agreement was to the effect that: "The Chinese Government will in future extend the Changchun-Kirin railway to the southern border of the Yanchi district, and connect it through Hoiren in Korea with the Korean railways. The method of construction of the 'Kirin-Hoiren' railway should be the same as that adopted for the Changchun-Kirin railway. The construction period will be determined by a supplementary agreement between China and Japan, depending upon circumstances."

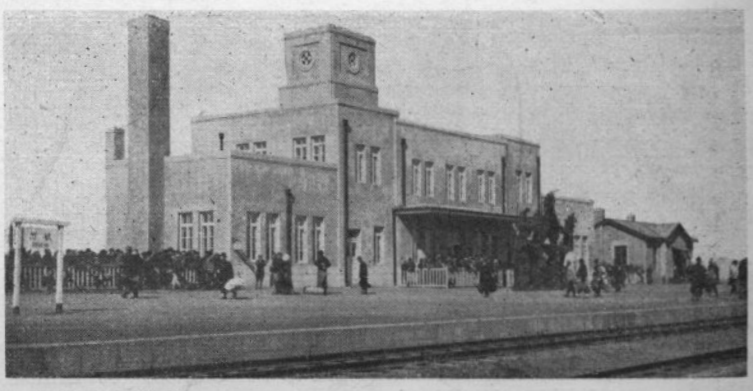
However, after 1909, the question of an extension of the Kirin-Changchun Railway and that of the construction of the Kirin-Tunhua Railway fell into abeyance for a long time and were not



Entrance to Administration Building

* *Manchurian Monitor.*



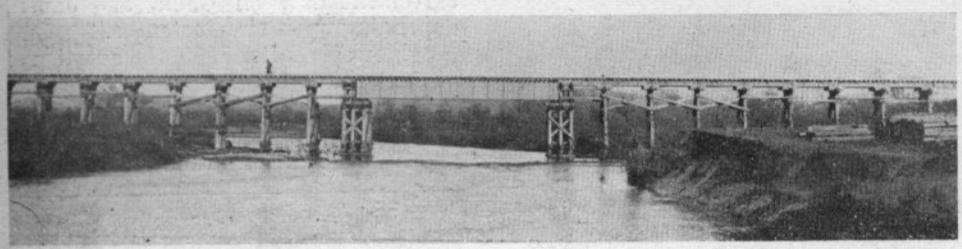


Front and Rear Views of Yaoho Station

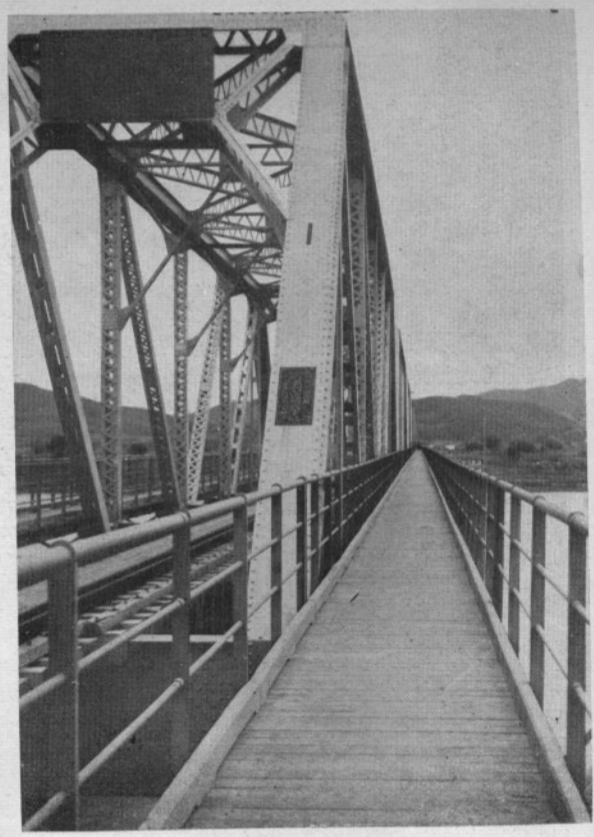
Kirin-Tunhua Railway Bridge Over the Sungari River

Bridge Over Bottom Lands Approaching the Sungari River

Ayaho Railway Bridge



Ayaho Railway Bridge



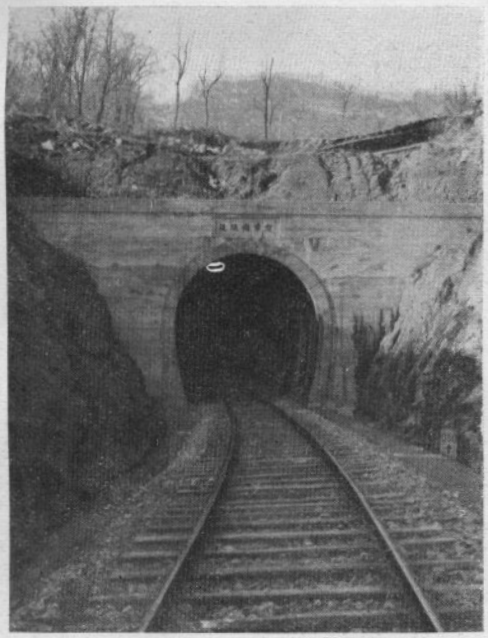
End View, Sungari River Bridge

put forward until 1918. From the latter year, owing to a number of circumstances, it became again one of the foremost questions of Manchurian railway construction. On June 18, 1918, a preliminary agreement was signed between a group of Japanese banks (Japanese Mortgage Bank, Bank of Chosen and Bank of Taiwan) and the Peking Ministry of Communications for a loan to be granted to China for the construction of the Kirin-Hoiren Railway. This agreement was to be ratified after six months after signing, after which it was proposed immediately to proceed to the construction of the railway, and surveying parties were sent out for preliminary work.

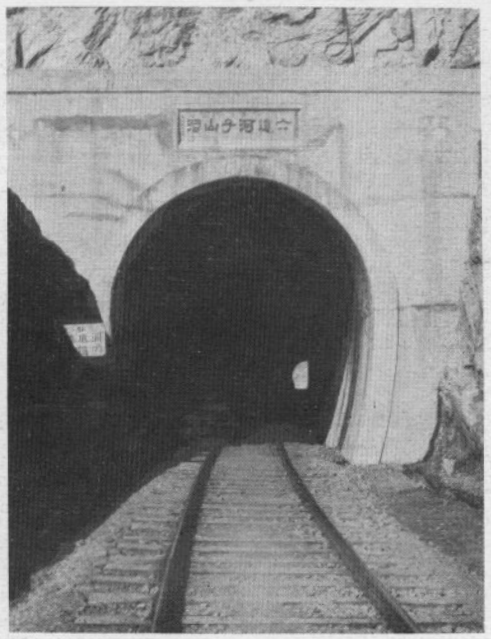
Simultaneously the said bank paid to the Chinese government an advance of Y.10,000,000 (for preparatory work prior to the construction on account of the future loan). However, owing to political complications n China, the proposals for the beginning of the construction of the line could not be put into effect. The advance itself, which China had received from Japan, was spent not according to its destination, provided by the original agreement with Japan, but for other purposes. Negotiations regarding the Kirin-Hoiren railway were resumed in 1925 only.

In May, 1925, the South Manchurian Railway Company applied to Marshal Chang Tso-lin that it be granted the right of constructing the Kirin-Tunhua Railway. Chang Tso-lin took this matter up with the Ministry of Communications in Peking. As a result, direct negotiations were opened between Mr. Yeh Kung-chow, at the time Minister of Communications, and Mr. Matsuoka, Director of the South Manchuria Railway Company. In the same year an agreement was signed between them according to which the construction of the railway was intrusted to the South Manchuria Railway (acting as contractor), which also temporarily assumed the construction expenses. According to preliminary estimates, the construction cost was calculated at Y.18,000,000, which were advanced to China by Japanese banks in the form of a loan at 9% per annum. Under the agreement China was to determine the term for redemption of this loan herself, but the reservation was added, that should this not be effected within the term of one year after the completion of the construction of the railway, the loan should be redeemed during the period of 30 years from the said moment. Until a complete liquidation of China's debt under this loan, the chief cashier of the railway should be a Japanese. The agreement provides that in future the new railway shall be managed conjointly with the Kirin-Changchun Railway.

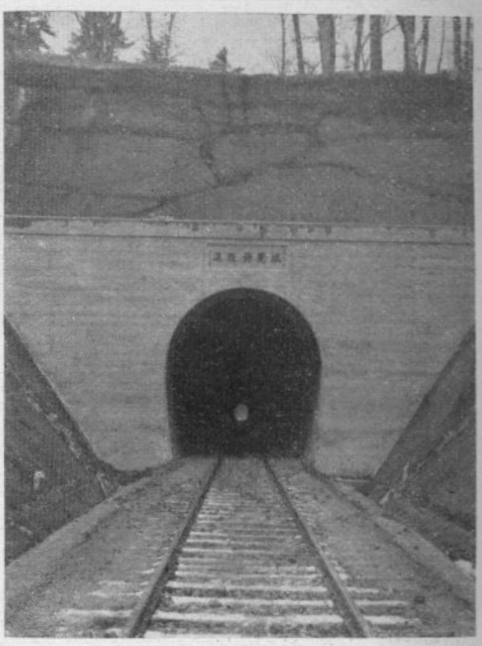
The agreement entered into with Japan was published on October 20, 1925, and on January 26, 1926, the administration of the new railway was opened in the head office of the Kirin-Changchun Railway. The Japanese engineer Tabe-Toshio was appointed



Laoyehling Tunnel



Liudaohotze Tunnel



Weihuling Tunnel

chief engineer in charge of technical work, and construction of the new railway was begun in May, 1926.

The line was completed to Tunhua in autumn, 1928, and from the month of October of the said year through passenger and freight traffic over the entire line was opened from Kirin to Tunhua. All more or less responsible work was effected by Japanese contractors under the supervision of Japanese engineers. The final cost of the construction amounted to Y.24,000,000.

The Kirin-Tunhua Railway begins at the city of Kirin, crosses the Sungari river (at Tuangshantze) and from there proceeds in an easterly direction along the Maniuho river to the Laoyehling mountain range, which stretches from the north-east to the southwest on the border between the districts of Kirin and Emu.

The highest elevations of this range are the Chingling, Haichingling and Tangtalatze. The Kirin-Tunhua Railway crosses the Laoyehling range by a tunnel. After the latter the railway passes through the Lafaho plain and enters into a forest region, and after running through Chiaho, Chingling, Tashaho and other points, it reaches the city of Tunhua. Generally speaking, the greater part of the profile of the railway is mountainous, excepting the above mentioned Lafaho plain and the nearest surroundings of Kirin. The greater part of the mountains is covered with dense virgin forests. All this country is intersected with rivers—in the west the Maniuho river and in the east the Chiaoho.

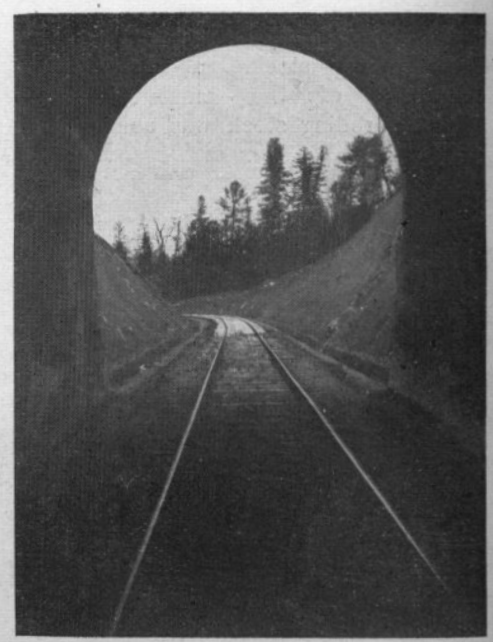
The railway is of the same Chinese standard gauge of 4 feet 8.5-in. as the Kirin-Changchun Railway. Its length is 210 kilometers.

On the line there are the following 17 stations (shown are the distances, number and extension of station sidings and principal constructions):

Denomination of stations	*Distance in km. From Kirin*	*Between stations*	*Number and length of station sidings*	*Depôts (roundhouses) and water-towers*
Kirin	—	—	Common sidings with Kirin-Changchun R-ly	Depôt and water tower
Lungtanshan	4.2	4.2	2 long, 700 m. each, 1 short of 300 m.	—
Chienmufeng	18.5	22.7	2 long, 700 m. each 1 short of 300 m.	—
Ehomu	20.6	43.3	4 long, 700 m. each, 1 short of 300 m.	Water tower
Liutaohotze	11.6	54.9	1 long of 700 m., 1 short of 300 m.	—
Laoyehling	10.3	65.2	2 long, 700 m. each, 1 short of 300 m.	Water tower
Siaokuchientze	19.2	74.4	2 long, 700 m. each, 1 short of 300 m.	—
Lafa	10.9	85.3	1 long of 700 m., 1 short of 300 m.	—
Chiaoho	12.4	97.7	6 long, 1 short of 400 m. and branch to coal mines	Depôt and water tower

Whang Sungdien Tunnel

Water Tank at Lindaoho Station



Approach to Weihuling Tunnel

Lungtanshan Station

Laoyehling Station

Denomination of stations	*Distance in km. From Kirin*	*Between stations*	*Number and length of station sidings*	*Depôts (roundhouses) and water-towers*
Luishuhotze	19.9	117.6	2 long, 700 m. each, 1 short of 400 m.	—
Erhtahotze	14.6	132.2	1 long of 700 m., 1 short of 400 m.	Water tower
Huanghuasingtientze	10.0	142.2	1 long of 700 m., 1 short of 400 m.	—
Weihuling	14.7	156.9	3 long of 700 m.each, 1 short of 400 m.	—
Huangniho	16.8	173.7	2 long, 700 m. each, 1 short of 400 m.	Water tower
Tsulikow	16.8	190.5	2 long, 700 m. each, 1 short of 400 m.	—
Taipingling	10.5	201.1	1 long of 700 m., 1 short of 400 m.	—
Tunghua	9.4	210.4	6 long, 700 m. each, 2 short of 400 m.	Depôt and water tower

The following are the three most important stations of the Kirin-Tunhua Railway: Kirin, Chiaoho and Tunhua.

From Chiaoho station in the end of 1928 a narrow gauge branch, 10 kilometers long, was constructed to the Yuntzeshan coal mines.

This branch was built exclusively at the initiative of the Chinese side in order to provide the railway with its own coal. In the first months of its operation the railway used Fushun coal exclusively.

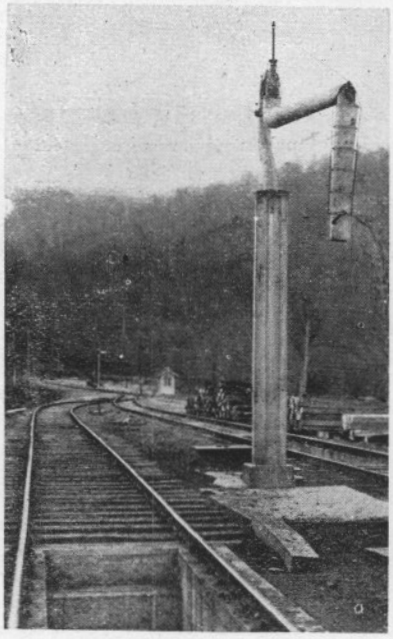
For the time being the Kirin - Tunhua Railway is but inadequately supplied with rolling stock. In the beginning of the current year its rolling stock was as follows :

Denomination	*Number*
Locomotives Nos. 501—506	6
Passenger coaches of Mixed I and II class	2
Passenger coaches III class	12
Mail vans	2
Cars for train crews	6
Freight cars, with iron roofs, with carrying capacity of 30 tons each, Nos. 1201—1235	35
Cars for transportation of coal, with loading capacity of 30 tons each, Nos. 1601—1632	32
Open platforms with loading capacity of 15 tons each	20

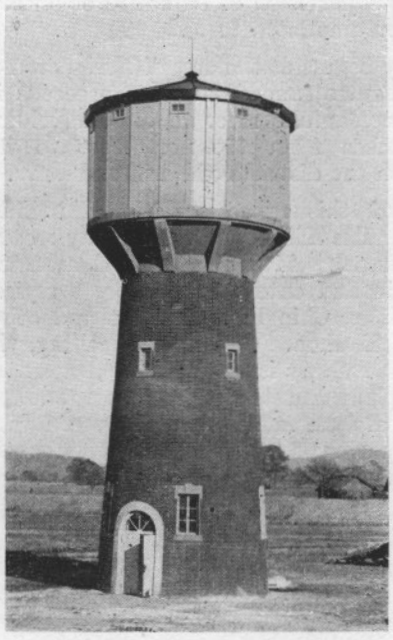
In addition to the above mentioned rolling stock about 32 cars with a loading capacity of 20 and 30 tons have been transferred to the Kirin-Tunhua Railway from other Chinese Railways (Peking-Mukden, Peking-Suiyan, Peking-Hankow, Tientsin-Pukow and others). Including these cars the Kirin-Tunhua Railway disposes therefore of a rolling stock of about 120 freight cars.

The management of the railway expects that during the first years of its operation it will carry, according to conservative estimates, from 7,000 to 8,000 cars of timber material per annum, which will be equivalent to 200,000 —240,000 tons.

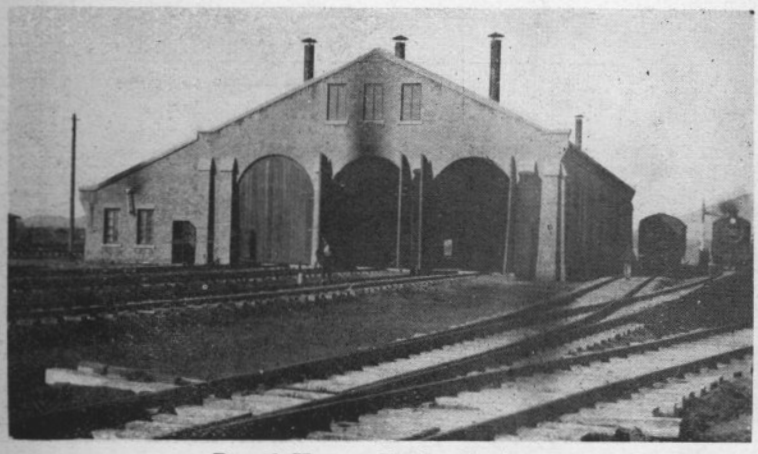
It was already stated above that it is proposed to extend the Kirin - Tunhua Railway further to the east to the boundary with North Korea, and later gradually to put into effect the construction of a number of new lines, connected with the Kirin-Korean railway. All this will form the beginning for the above mentioned new trunk system in Manchuria.



Stand Pipe, Laoyehling Station



Water Tower, Yaoho Station



Round House: Yaoho Station

Erhdaohotze Station

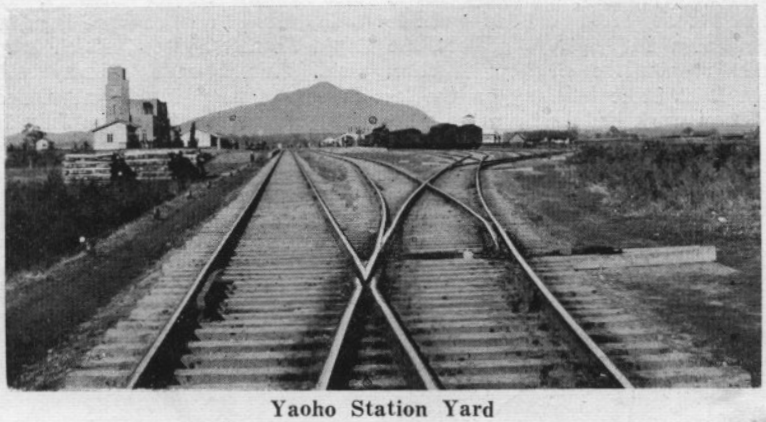
Street in Tunhua

The following lines are planned :—

(*a*)	Extension of the Kirin-Tunhua Railway from Tunhua to the Korean frontier	224.0 km.
(*b*)	Construction of Changchun-Talai Railway	209.6 ,,
(*c*)	Construction of Taonan-Solun ,, ...	225.0 ,,
(*d*)	Construction on Yanchi-Hailin ,, ...	265.0 ,,
(*e*)	Construction of Kirin-Wuchang ,, ...	240.0 ,,

The construction of all these railways will call for the expenditure of from 120 to 130 million yen according to preliminary estimates (Y.100—110,000 per kilometer).

It is proposed to extend the line from Yanchi to Hailin in future to Sansing, and the Changchun-Talai line to connect with the Taonan-Solun Railway. In the future the last mentioned railway will be extended to Hailar (So-Hai Railway), and from Hailar to Shihwei (Ha-Shi Railway) on the Argun river facing the Nerchinsky Zavod (Works) in Transbaikalia. It is also proposed to extend the Kirin-Wuchang Railway to Harbin.



Yaoho Station Yard

All these railways taken together will form the future new trunk system, which will radically change the existing transportation conditions in Manchuria, and also in part modify the routing of the goods in the country, as will be shown below.

In the first place it will be necessary to construct the extension of the Kirin-Tunhua Railway to the east.

The existing plans provide for the following trac ngs of the new line from Tunhua : Tunhua-Tachiao - Lengshuichuitze - Haerphaling range (boundary between Yanchi and Tunhua districts)-Fangmilatze-Liangpingtai-Kunniulatze-Wangpayaotze - Wungshenglatze - Wuhutingtze (2 tunnels will have to be built here)-Yuishuchuan-Laotowkow.

The distance from Tunhua to Laotowkow is about 118 km. (according to other estimates—106 km.).

From Laotowkow there may be two variations :

1. From Laotowkow at present there already exists a narrow-gauge "Tien-Ti" Railway (2-ft. 6-in. gauge), operated jointly by the Nammansui Taikyo and the Kirin government, which runs south-east to the Korean boundary (Tienposhan line), for a distance of 122.5 km. from the terminal station of Tienposhan and 110.5 km. from Laotowkow, and afterwards, crossing the Tumen river is continued on Korean trerritory (Tumenkiang railway) for a distance of 40.7 km.

The Tienposhan railway was built between 1922 and 1924. It has a branch to Yanchi about 10 km. long.

The Tumenkiang narrow-gauge railway was built between 1919-1924 by the Chinese-Japanese joint stock company Nammansui Taiko (Taising South Manchurian Co.). It runs on Korean territory along the Tumen river to the city of Hoiren (Kwainei).

There exists a project of directing the Kirin-Tunhua Railway from Laotowkow south-east to the frontier post of "Tifang" (on the Chinese side), which is also called Kaoshan. In such case it would pass through the following points : (stations of the Tienposhan railway) : Laotowkow, Chaoyangchuan, Lungchitsun, (large trade center, with a commercial port office and Japanese consulate), Tungcheniung, Chechang-kang, Pataohotze, Shimentze, Kaishantun and the Tumenkiang river—Korean border. Over the Tumen river a large railway bridge has been constructed at this point in October 1927. It connects the Tienposhan line with Shansanfeng station of the Tumenkiang railway. The length of the entire Tumenkiang railway is 57.8 km. and from Shansanfeng to Hoiren—40.5 km. On this line are the following stations : Chiotzanho (Shansanfeng), Kampei (Chienping), Sinden (Sintien), Kakuho (Haopu), Koreichin (Kaolingchen), Sinkainei (New Horrieng Chinese—Sinhuining), Kwainei (also called Hoirien, or Hoiren, Huining in Chinese).

The Tien-Tu Railway it is proposed to buy out and transform into a normal gauge line.

From Hoiren a Japanese government railway, which was constructed in 1914-1917 being a part of the North Korean trunk system (Kankyosen—Gensan—Kwainei) runs to the port of Seishin, its length be ng 92.9 kilometers.

As soon as the Tunhua Railway is extended to Laotowkow, it will immediately be connected with the port of Seishin, in the beginning by a narrow gauge line (Tien-Tu railway of 151.2 km.), which, however, in the course of the next few years will be rebuilt into normal gauge. The distance from Tunhua to Seishin will in such case be equal to 118+50.5+92.9=361.4 km. (including the unbuilt section of 118 km. between Tunhua and Laotowkow).

(*Continued on page 43*).

Street in Tunhua

THE FAR EASTERN REVIEW

DEPARTMENT OF COMMERCE
APR. 30 1932
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上海黃浦灘念四號

遠東時報

BANDITS, COMMUNISM, DEMOBILIZATION AND LOANS

JAPANESE PLOT AGAINST CHINA !

EXTRATERRITORIALITY ! AN EQUITABLE PROPOSITION

DIESEL ELECTRIC LOCOMOTIVES IN ASIA

REPAIR OF LOCOMOTIVES IN JAPANESE GOV'T RAILWAYS

AVIATION AND MARINE ENGINEERING PROGRESS IN THE FAR EAST

Vol. XXVII

FEBRUARY, 1931

No. 2

Railways First

Progressive Chinese Railway Legislation

In the leading article in our January issue, attention was invited to the trend towards the creation of an absolute governmental monopoly in the ownership and operation of railways and other public utilities, which if followed to its logical conclusion, would lead to the establishment of a socialistic, if not a communistic state, with all avenues closed to private initiative. In the present condition of the national credit it is impossible for the Government to raise the necessary loans from abroad to proceed with urgent railway construction and rehabilitation. If there is to be any immediate development in new railway extensions, the funds will have to be raised in China and permission granted to private capital to build and operate secondary lines and feeders to the state system.

It is reported from Nanking that the Ministry of Railways has drafted a new Railway Law for submission to the Legislative Yuan, defining the status of Government railways and laying down the conditions under which private interests, Provincial and Local Governments, may construct and operate railways. The mere fact that such a law has been drawn up— whether it passes or not—is a sign of progress, a return to normalcy on the part of Kuomintang leaders whose intense radicalism in the first stages of the nationalist revolution and the implantation of communist ideas through slogans imported from Moscow, seemed to presage the adoption of Soviet theories in regard to private enterprise. Although this tendency has not by any means disappeared, it is encouraging to find one Minister with the strength of mind to advocate a change in the policy of his colleagues and press for the enactment of legislation which throws open his own special field of activity even though this be restricted within well defined limits. The Chikow-Shihkiachwang Railway (connecting the Peking-Hankow and the Shansi Line with a port on the Gulf of Chihli), by a private company is reported to be making progress and it is expected that work will be started in the near future. There are several other connecting and provincial lines that could be pushed ahead with private Chinese capital if the necessary permits could be obtained.

The draft Law submitted by the Railway Ministry, which consists of 28 articles, stipulates that, as a general rule, all railways affecting the communication of the country or constructed for general transportation purposes must be State enterprises; while lines which are not constructed for general transportation purposes or whose use is confined to only one locality may be operated by private individuals in accordance with the regulations governing private-owned railways or regulations governing railways built for special purposes.

In order to develop communications within one particular province or municipality, the local Governments concerned may raise funds for the construction of railway lines in conformity with the regulations governing the construction of railways by local governments.

Private interests may, subject to the approval of the National Government, undertake the construction and operation of projected Government lines, on which construction work is not started at the prescribed date.

Foreign capital may be borrowed for the construction of Government lines. The terms of such loans must, however, be based on the principle of equality and reciprocity and be in no way derogatory to the national sovereignty.

Unless specially authorized by the National Government, no person shall be allowed to construct, extend or purchase any railway line within the limits of China's territorial jurisdiction.

No local Government, unless authorized by the National Government, shall be allowed to negotiate and contract foreign loans for the building of railways or grant to any foreigner the special privileges referred to in the preceding paragraph.

The power of administration over Government lines rests with the Ministry of Railways; lines operated by private interests or local Governments shall be under the Ministry's general supervision.

Military transportation on Government lines shall be carried out in accordance with the Government regulations governing military transportation and such other regulations as may be jointly decided upon hereafter by the Ministries of War and Railways.

Whether in time of peace or during war, private-owned railways may be used for military transportation purposes in accordance with regulations to be formulated by the Ministry.

Public loans floated for the purpose of building railways shall not be diverted to other uses. Earnings or profits of Government railways must, after being devoted to the expansion and improvement of the railway, be applied, in priority, for the repayment of the railway debts.

The Government may, within a specified period and in accordance with prescribed legal procedure declare its intention to take over any private railway lines. During such period, the lines concerned shall not be amalgamated with other lines. The Government may also take over railway lines operated by local governments by the same procedure.

Chikow-Shihkiachwang Railway

To Link the Peking-Hankow and Tiensin-Pukow Lines

The construction of a railway, which will facilitate the transportation of products from Honan and Shansi will be commenced at the end of the month by a company formed by wealthy Chinese merchants of north China.

The railway will be known as the Chikow-Shihkiachwang Railway, Chikow being a town at the mouth of the Kien River which flows into the Gulf of Chihli, and Shihkiachwang, an important city on the Peking-Hankow Railway in Chihli Province. It will link up the Peking-Hankow and the Tientsin Pukow Lines, and pass through 21 towns and cities in Chihli, including Chaochow, Sintsi, Shenchow, Wukianghsien and Tsangchow. Chikow, the eastern terminus of the railway, can be developed into a good harbor where the coal of Shansi, can be exported instead of through Tientsin and Tsingtao.

The proposal for the construction of this railway was made by the former Peking Government, but was not carried into effect on account of uncertain political situations. During August, 1929, some wealthy merchants of North China formed a company to construct the line, the original plan, but, when the company secured permission in this connection from the Ministry of Communications in the same year, it decided to extend the line to Chikow, making the total length of the railway to 290 kilometers.

It is learned from the Government circles that $15,000,000 has been already raised by the company in question for this purpose and, as stated, construction will be commenced at the end of this month. However, in order to facilitate the construction work, the railway will be built in four sections, the first section being from Shihkiachwang to Tunglu. After the completion of the first section, the company will undertake the construction of the three other sections, namely, from Tunglu to Sienhsien, from Sienhsien to Tsangchow and from Tsangchow to Chikow.

Engineering Advertising in the Far East

(Continued from page 76)

For these and many other reasons, the engineering manufacturer in America, Europe and Japan, is not receiving full returns from his advertising expenditures in this part of the world. Unless the manufacturer takes a deeper interest in his advertising and general publicity, he will make little progress in introducing his products in these markets.

In other words, the same policy that governs the expenditure of the advertising appropriation at home, must be followed in the Far East. If engineering manufacturers expect to have their name and products widely known in this part of the world, they must use an engineering medium which reaches those interested in purchasing their specialties.

of activity 1,000 kilometers. Six 900 h.p. Frichs 4-8-4, two generating sets, four traction motors: approximate weight 86 tons: radius of activity, 1,800 kilometers. Six 400 h.p. Sulzer Brothers, two bogies, four drawing axles, two carrying axles, one generating set, weight 60 tons. Six 200 h.p. Frichs railcars.

The cost of operating Diesel rail cars as compared with steam service varies somewhat with the service. Two Sulzer Diesel rail cars operated in the Appenzell Railway, Switzerland, over a period of 268 days for both cars, each running 200 kilometers per day showed the following results:—

Cost of Steam Service

268 days by 220 km—58,960 km by 45 cts.	= Sw. Frs.	26,532.00
1 man extra for the service 266 by Frs. 17	= ,, ,,	4,556.00
	Sw. Frs.	31,068.00

Cost of Diesel Rail Car Service

268 days by 220 km—58,960 km by 10.2 cts.	= Sw. Frs.	6,014.00
Extra expenses for steam service	= Sw. Frs.	25,074.00

From these figures it is seen that the Appenzell railway, by adopting the Sulzer rail cars, reduced the bare working expenses to about 20 per cent of the expenses for steam service. In addition to that it is said that the rail cars prove more economical than had been assumed when the project was first accepted, for they enable the number of trains to be increased, and because of this some of the passenger traffic of a rival railway has been captured by the Appenzell railway.

The six Sulzer Diesel electric locomotives for the Siamese State Railways are to be used for mixed traffic and also for shunting. Each locomotive is equipped with a 400 b.h.p. single-acting eight-cylinder Sulzer four cycle Diesel engine, direct coupled to a D.C. dynamo, which supplies current to four driving motors mounted in tram suspension on both the outer axles of the two six-wheeled bogies. The fuel consumption is low and the consumption of water practically nil, advantages which allow trains to be hauled over the longest runs in Siam without changing the locomotives.

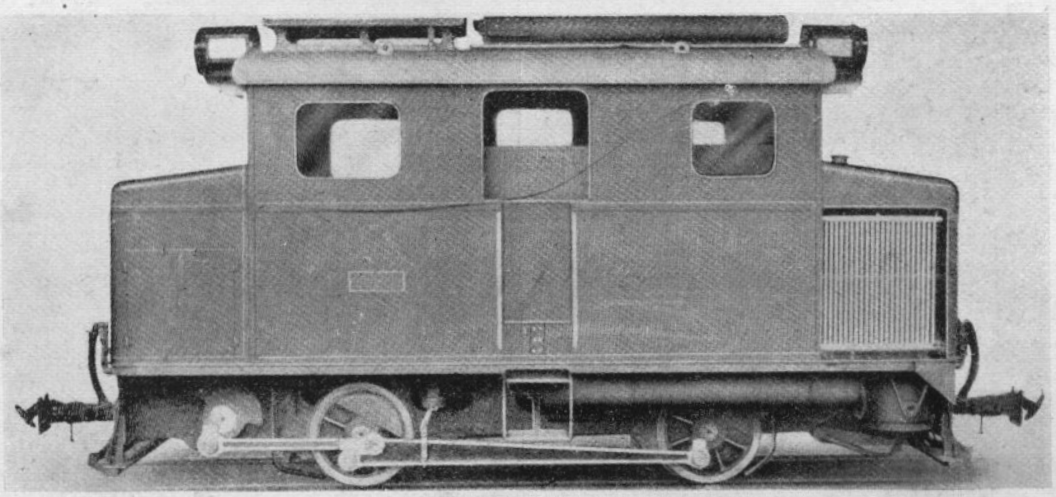
Diesel Electric Locomotive for the S.M.R.

Last year, the South Manchuria Railway Company ordered from Sulzer Brothers a 750 b.h.p. Diesel electric shunting locomotive to be used in the Dairen yards and wharves. Sulzer Brothers, carried out very satisfactory tests with this locomotive on the Swiss Government Railway Line between Winterthur and Romanshorn during last November. The locomotive can pull 1,800 tons at a speed of 25 km. per hour and can develop a speed up to 65 km. per hour when the load is correspondingly reduced. When making the trial run, up to 14 cars were trailed by the above locomotive. This locomotive shown in Fig. 3, page 4 having two bogies is, therefore, very flexible in the curves.

The locomotive is fitted with a Sulzer 8-cylinder Diesel engine with airless injection, capable of developing momentarily an output of 850 b.h.p. This engine has been tested with Tarakan oil and it has proved that this high speed engine, even with this thick oil, runs in every respect satisfactorily.

The output of the engine is first transmitted to a generator which generates the necessary current for the four driving electric motors which are fixed on the bogies. The locomotive can be handled by one man only as the cooling water circulation, the lubrication of the engine and the conveying of the fuel oil to the engine are entirely automatic.

S.L.M. DIESEL LOCOMOTIVE FOR ROYAL STATE RAILWAYS OF SIAM



Diesel Locomotive Built for the Royal State Railways of Siam, and Fitted with Oil Operated Mechanical Transmission Gear

Gauge	.. 3-ft. 3-3/8-in.	Max. tractive effort ..	.. 11,000 lbs.
Diam. on Tread of Drivers ..	2-ft. 9-7/16-in.	Light weight ..	.. 49,000 ,,
Wheel base	.. 9-ft. 2-1/4-in.	Weight in working order	.. 51,800 ,,
Motor power	.. 200 b.h.p.	Speeds 4.35, 8.1, 12.4, 17.4, 25 m. p. h,	
Motor speed	.. 300/500 r.p.m.		

The locomotive has a driver's cabin at both ends. The Diesel engine is mounted in the middle of the car body. The mechanical parts have been made by the Schweiz Industrie Gesellschaft in Neuhausen and the electric parts by the Maschinenfabrik Oerlikon, so that the whole locomotive is entirely Swiss made.

Fig. No. 4 shows the interior of the locomotive and Fig. No. 5 shows one of the driver's cabin.

The running costs of such a locomotive are very small as the Diesel engine is the most economical engine which can be found at present.

The possibility to stop the Diesel engine from the driver's cabin and to put it again in service within a few seconds results in a further economy of running costs. When running down hill or when the locomotive is at standstill, the engine is stopped and, therefore, does not consume any fuel during this period.

Diesel Rail Cars for S.M.R.

Besides this locomotive, the S.M.R. Co. have ordered from Messrs. Sulzer Brothers two Diesel rail cars, each of 250 h.p. which will be used for carrying passengers. Each car has a seating capacity for 60 passengers and fitted with a 250 b.h.p. Sulzer

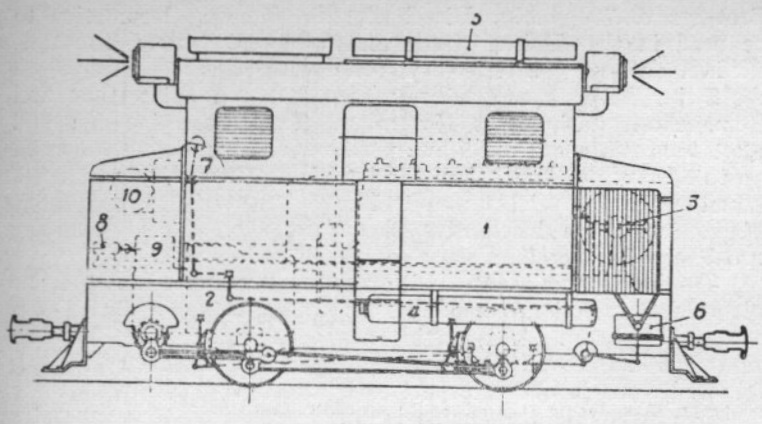


Fig. 1.—S.W.4 Diesel Locomotive 200 b.h.p.

(1) Engine
(2) Transmission gear
(3) Cooler and fans
(4) Starting air bottles
(5) Exhaust-silencer
(6) Vacuum brake cylinder
(7) Hand brake
(8) Lighting set
(9) Vacuum pump
(10) Vacuum receivers

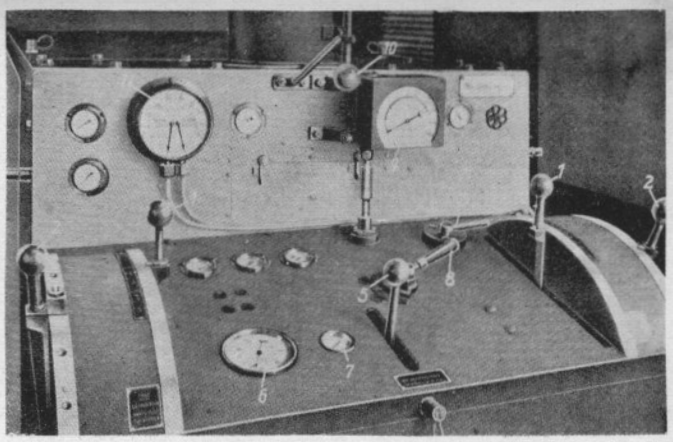


Fig. 2.—Driver's Desk of the Diesel Locomotive

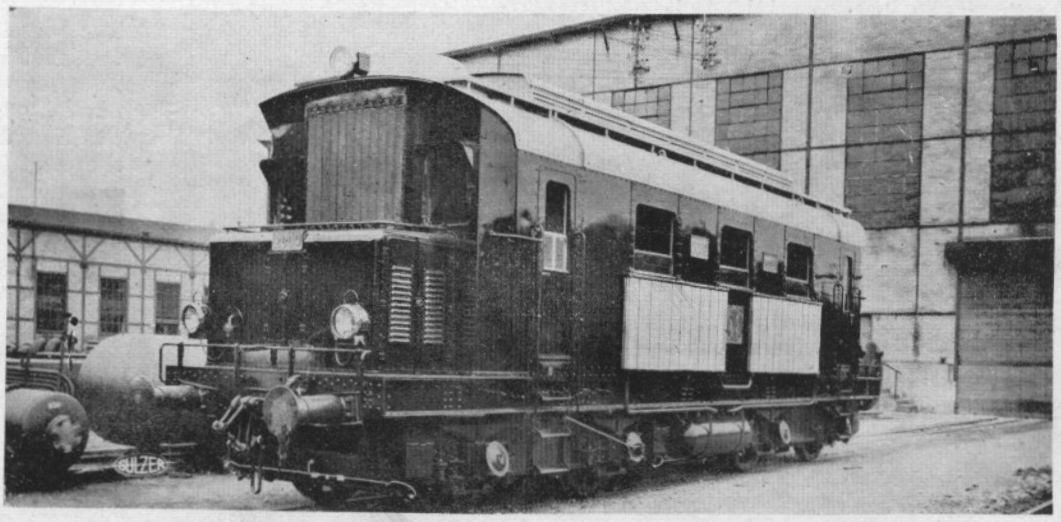
(1) Fuel regulation
(2) Control of oil operated mechanical transmission gear
(3) Fuel cock
(4) Valve for regulating the air pressure of the fuel tank
(5) Reverse gear
(6) Tachometer
(7) Cooling water thermometer
(8) Sander
(9) Speed indicator
(10) Whistle
(11) Duplex vacuum gauge

Diesel engine. The car bodies will be made at the S.M.R. workshops, whereas the Diesel engine, electric parts and bogies will be supplied through Sulzer Brothers who act as general contractor. These rail cars are to be delivered in March.

In addition to the two Sulzer Diesel rail cars, purchased by the S.M.R., thirteen similar cars are to be put in service on the line this spring. It is also proposed to build 17 more Diesel rail cars during the next fiscal year to be increased later by an additional nineteen or 36, all told. Some of these cars will accommodate 100 passengers and others only fifty, for short passenger hauls from the larger cities of Dairen, Mukden, Changchun and Antung.

It is the intention of the railway authorities to have all these new cars in service by 1933. Each 100 seater car is estimated to cost Y.25,000. All the passenger traffic between Dairen and Port Arthur will be handled by these rail cars, releasing the locomotives for other services. The car bodies will be built at the Shakako Works of the S.M.R. near Dairen.

The operation of these Diesel rail cars on the S.M.R. follows the adoption of similar cars on many Japanese government and private railways, who have felt the pinch of bus competition. Nearly every railway line in Japan has been deprived of a large part of its passenger traffic by the ever increasing extension of automotive transportation, and as a counter measure have adopted the gasoline motor driven rail cars in order to reduce expenses.



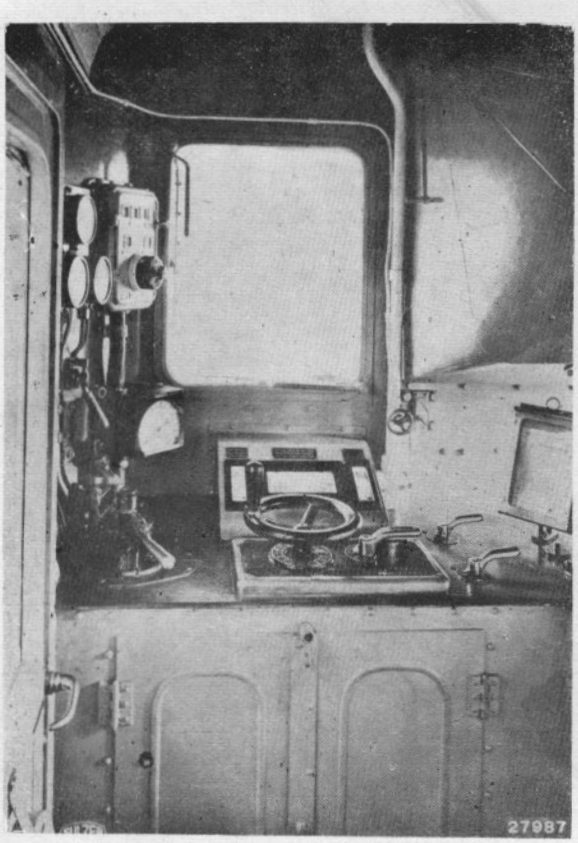


Fig. 3.—750 b.h.p. Sulzer Diesel Electric Shunting Locomotive for the S.M.R.

Fig. 5.—Driver's Cabin

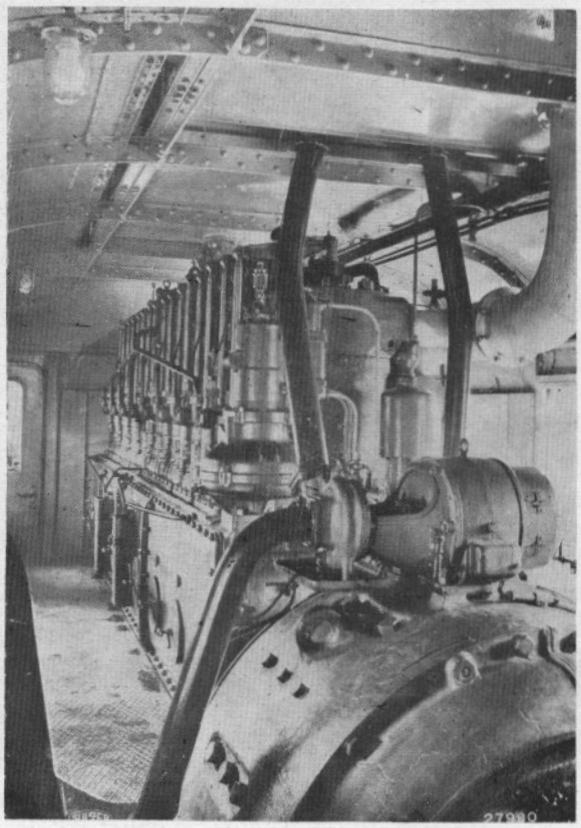
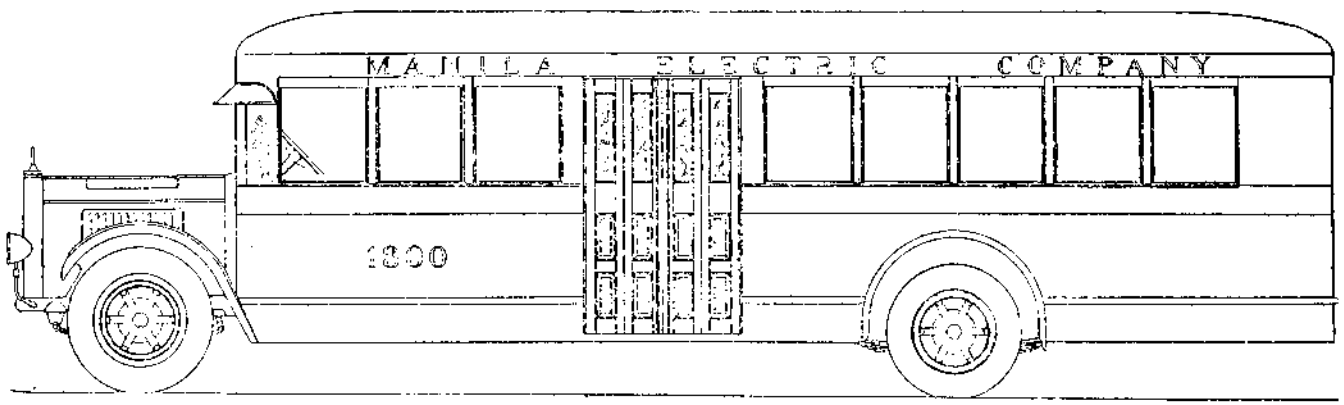


Fig. 4.—750 b.h.p. Diesel Engine



New Bus Lines in Manila Will Use Large Bus Body Built on Mercedes-Benz Diesel Chassis

Gasoline Cars on Japanese Railways

During 1929, thirteen private Japanese railways adopted gasoline cars and other lines are rapidly following their lead. The Japanese Government Railway Department are operating many rail cars, equipped with American motors, in which the Ford, Buda and Wisconsin types prevail. The tendency, however, towards using home-made material will eventually hand over this business to Japanese motor manufacturers, whose products are being extensively used in all other lines. The Ikegai Iron Works of Tokyo, the Tokyo Gas and Electric Company, the Kobe Steel Works and the Niigata Iron Works specialize in the smaller Diesel engine units. The Ikegai Iron Works have supplied several 40 h.p. motors to the Government Railways for rail car propulsion. Every effort is being made in Japanese engineering circles to produce an engine suitable for these operating conditions. In the meantime, orders are being placed in America and Europe for rail car engines. The following table gives the particulars of some of these cars now in operation in Japan and Chosen.

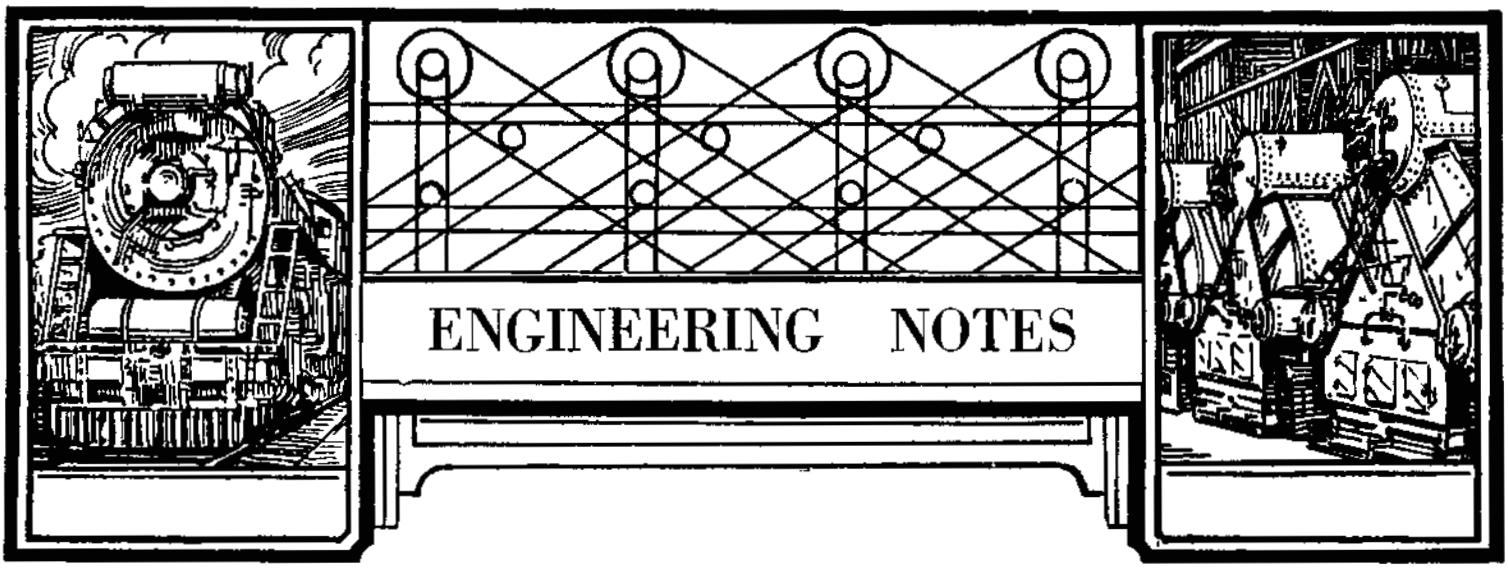
Esslingen M.A.N. Diesel Electric Locomotive for the S.M.R.

In addition to the Sulzer Diesel Electric Locomotives ordered for the S.M.R. the company has placed an order with the Maschinenfabrik Esslingen for a similar locomotive equipped with a M.A.N. Diesel engine. This locomotive is a Bo—Bo 700 h.p. type, driven by a M.A.N. light weight, high-speed Diesel engine working on the 4-cycle principle, single acting, having an output of 700 h.p. at 700 r.p.m. The complete locomotive data is as follows:

Diesel Cylinder, diam. and stroke ...	280/380 mm.
Normal output	700 h.p.
Maximum ,, ...	750 ,,
Voltage in Main Circuit	700 v.
Generator output...	435 kw.
Voltage in the auxiliary circuit... ...	150 v.
Exciter output	68 kw.
Four Traction Motors, each	100 kw.
Gear ratio	1:5,06
Maximum tractive effort	17,000 kg.
One Hour tractive effort at 17 km/hr....	7,000 kg.
Continuous tractive effort at 25 km/h.	5,600 kg.
Maximum speed	60 km/h.
Overall length	11,200 mm.
,, width	3,210 ,,
,, height	4,660 ,,
Diameter of Wheels	1,120 ,,
Bogie Wheel Base	2,400 ,,
Distance between center pins of truck...	5,500 ,,

GASOLINE CARS ON JAPANESE RAILWAYS

User	Keinan Railway Co.	Chosen Railway Bureau	Nagaoka Railway Co.	Jap. Govt. Rys.	Shantung Railway	Chosen Railway Co.
Builder	Japan Rolling Stock Mfg. Co.	Maruyama Rolling Stock Mfg. Co.	Amemiya Works	Nippon Sharyo	Maruyama Rolling Stock Mfg. Co.	Japan Rolling Stock Mfg. Co.
Gauge	4'-8½"	4'-8½"	3'-6"	3'-6"	3'-6"	2'-6"
Kind of Engine	Waukesha 6-SRL	Waukesha 6-RB	M.A.N. W 413 H 18	Ikegai	Waukesha 6-KU	Waukesha 6-XK
H.P. of Engine	60 h.p. at 1,200 r.p.m. 75 h.p. at 1,500 r.p.m.	2-100 h.p. at 1,200 r.p.m. 2-115 h.p. 1,500 r.p.m.	50 h.p. at 1,400 r.p.m.	40 h.p. at 1,200 r.p.m.	54 h.p. at 1,200 r.p.m. 80 h.p. at 2,000 r.p.m.	42 h.p. at 1,200 r.p.m. 50 h.p. at 1,500 r.p.m.
Side of Operator	Both end	Both end	Both end	Both end	Both end	Both end
Wt. of Car in empty (K.T.)	12.95	20	20	18	6.8	7
Wt. of Car in working order H.P. per ton of car	5	5	2.5	2.2	8	6
Wt. of car per H.P.	200 kg.	200 kg.	400 kg.	450 kg.	126 kg.	167 kg.
Length of car body	9200	17070	11900	9000	27'-6" (8380 mm.)	34'-5" (11430 mm.)
Width of car body	2940	2600	2440	2800	8'-0" (2450 mm.)	7'-0" (2130 mm.)
Height of car body	2300	3840	3880	....	11'-9½" (3590 mm.)	10'-6" (3200 mm.)
Seat Capacity seat	37 cross	50 parallel	32 parallel	34 cross	20 parallel	48 cross
Seat Capacity stand	8	50	38	9	20	10
Seat Capacity total	45	100	70	43	40	58
Baggage Compartment	4' × 9'	No.	No.	....	No.	No.
Kind of truck	4-wheel	Bogie	Bogie	4-wheel	4-wheel	Bogie
Speed	32 km/h at grad 1/66 average speed 48 km/h	Max. 64 km/h	48 km/h at level	50 km/h at level 19 km/h at 25 grade	Max. 42 km/h	Engine 1,400 r.p.m. 38.5 km/h
Kind of brake	Hand, air brake	Hand, air brake	Hand brake	Air brake	Hand brake	Hand brake
Dia. of wheel	34"	34"	34"	860 mm.	34"	28"
Journal bearing	Roller bearing	....	....	....	....	Roller bearing
Tank capacity	20 gallon	30 gallon	4 cub. ft.	....	20 gallon	20 gallon
Car body	Semi-steel	Semi-steel	Semi-steel	Semi-steel	Semi-steel	semi-Steel
Heater	Exhaust of engine	No.	....	cooling water	No.	Exhaust of engine
Toilet	Yes	No.	No.	....	No.	No.
Price	Y.18,250	Y.38,300	Y.20,000	Y.15,000 Y. 8,600 Y. 6,400	Y. 8,500	....
	....	....	....	....	....	....
	....	....	....	....	....	....



ELECTRIC LIGHT, POWER AND TRACTION

HULAN SUGAR REFINERY POWER HOUSE :—In order to unify the control of electricity enterprises about the Harbin district, the Harbin Electricity Co. (the Tienyeh Kungsus), a Chinese concern, Harbin, has bought up the power house belonging to the Hulan Sugar Refinery Co. for $158,000.

TRACKLESS ELECTRIC TRAMS FOR TOKYO :—The trial operation of trackless electric trams in Honjo Ward will be undertaken by the Tokyo Municipality in the course of the next fiscal year.

If this experimental service should turn out successful, the service will be extended in various parts of the city with a view to relieving the present congestion of service.

POWER PLANT REGULATIONS.—In compliance with petitions from the National Association of Public Utility Corporations, the Legislative Yuan is considering a revision of the Regulations governing the Supervision of Private Electrical Enterprises.

The provision in the present Regulations stipulating that after the lapse of twenty years, the Government may take over and purchase the interests of any private electrical utilities will be revised so as to provide for the change of the period from twenty to thirty years.

Notwithstanding the petitions, the provision to the effect that foreign capital shall not be allowed in private electrical utilities will not be revised.

Another revision under consideration deals with the case of a given enterprise subject to the jurisdiction of two or more Provincial Governments. In such event the Central Government, instead of the two Provincial Governments as provided in the present regulations, shall exercise the power of supervision.—*Kuo Min.*

Nanking, February 22.—A revision of the Regulations governing the Supervision of Private Electrical Enterprises was adopted at the 132nd meeting on the Legislative Yuan yesterday.

Article 14 of the Regulations stipulating that after the lapse of twenty years, the Government may take over and purchase the interests of any private electrical enterprise has been revised so as to provide for the extension of the period from twenty years to thirty years.

Notwithstanding petitions from the Association of Public Utility Corporations, no revision was made of Article 11 which provides that foreign capital shall not be allowed in privately-owned electrical utilities.

With regard to cases where an enterprise is subject to the jurisdiction of two or more Provincial Governments, it was decided that inasmuch as the logical interpretation of Article 3 is that in such cases the Central Government shall exercise the power of supervision, there is no necessity to make any revision as petitioned for by the Association.—*Kuo Min.*

SINGAPORE POWER EXTENSION :—The Singapore Municipal Commissioners has recommended :

(1) That the sum of $434,346 be provided by new loan for extensions to Electrical Power Station, and new mains to Bedok and 7th mile Upper Serangoon Road.

(2) That 1931 Budget be amended by transferring items $125,000 for Electrical Department Staff Quarters and $230,000 for New Mains, from Revenue Account to Loan Account.

RAILWAYS

CHAOYANGCHEN RAIL LINE :—The Shenhai Railway Administration has submitted a plan to the provincial government for the building of a branch line from Chaoyangchen to Fushun. The estimated cost is $2,110,000.

LUNGHAI RAILWAY EXTENSION :—The engineering work for the construction of the Lingpao-Tungkwan section of the Lunghai Railway is making satisfactory progress and the undertaking will be completed within six months, according to Mr. Chien Tsung-tse, Managing Director of the Lunghai Railway Administration.

TUBE TRAINS FOR TOKYO.—Negotiations are making steady progress between the Municipal authorities in charge of the tram car system and the leading business magnates of the city for the conclusion of an agreement on the proposed construction of the Tokyo underground railways as a joint enterprise.

The Tokyo Municipality at first attempted to raise the necessary funds by means of a loan bond issue, but the Government hesitating to give its approval to the project in the light of its policy, which is opposed to loans, the authorities have turned to business men for aid. The recent conversations resulted in a definite agreement for the undertaking of the scheme and details will be discussed by a committee to be appointed for the purpose in the early part of January.

NANKING TRAIN FERRY.—By order of Mr. Sun Fo, Minister of Railways, engineering work on the new train ferry service between Hsiakwan and Pukow must be hastened. In order that the program for through communications between the Tientsin-Pukow and Shanghai-Nanking Railways may be carried out as soon as possible, it is expected that the work of construction will be completed by March next year.

Engineering work on the train ferry was initiated on December 1, last year. Since then work has been in progress at both ends of the service at Hsiakwan and Pukow. The structure is designed to carry complete trains of 10 locomotives and cars to or from the Tientsin-Pukow and Shanghai-Nanking Railways.—*Kuo Min.*

NEW RAILWAY WHARF AT YINGKOW :—In order to increase traffic on the Peiping-Liaoning Railway, plans for the building of a large wharf at Yingkow capable of berthing steamers of 3,000 tonnage, have been made by the Railway Administration. Godowns near the wharf are also to be constructed. The cost of construction is estimated at $540,000 and the work is to be completed in four months. Actual work will be started in spring after the ice has thawed.

CHINESE RAILWAY ENGINEERS TO STUDY JAPANESE METHODS :—In an order to the various Government Railways in the country, the Ministry of Railways announces its intention to send a delegation to study the railway workshops in Japan. The members will be drawn from the senior workshop staffs, upon the recommendation of the Managing Director of the respective Lines. Members of the inspection party are due to assemble at the Capital on April 20, whence they will proceed to Japan.

JAPANESE ROLLING STOCK FOR KIAO-TSI RAILWAY :—The Purchasing Commission of the Ministry of Railways has placed orders with two Japanese firms for the supply of four locomotives at $30,000 gold each and 100, 40-metric tons steel wagons at $1,750 gold each for the Kiaochow-Tsinan Railway.

The locomotives will be manufactured by the South Manchurian Railway Company, at their Shakako Works. They will be of the "Mikado" type having a tractive power of 36,090 lbs. each. The contract calls for the delivery of these locomotives in August. The Mitsui Bussan Kaisha of Shanghai is the contracting firm for the locomotives. The steel wagons will be manufactured by the Kisha Seizo Kaisha, Ltd., of Osaka, Japan. Delivery is to be made by the contracting firm, K. Takaiwa and Company of Shanghai, in five months.— *Kuo Min.*

INDUSTRIAL

NEW COKE PLANT, TOKYO.—The Tokyo Gas Company will organize a coke company with a capital of Y.10,000,000 to cover the decrease of income due to the reduction of the supplying charges.

GOVERNMENT IRON AND STEEL WORKS.—The Ministry of Industry has appointed a Preparatory Committee for the early establishment of a Government Iron and Steel Works. The Committee is composed of Messrs. Hu Shuhua, formerly connected with the Shanghai Arsenal, Weng Wen-hao (Director of the Geological Survey), Wu Chien, Yen Chuung (Head of the Ministry's Labor Department), Hu Po-yuan (Head of the Mining Department) and Wang Chung-yu (Mining Expert).—*Kuo Min.*

ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW

上海黃浦灘念四號

遠東時報

A DIOS!
RAILWAYS FIRST
ANALYSIS OF CHINA'S BUDGET
BEHIND THE EXTRATERRITORIALITY BARRAGE
JAPANESE LOANS TO CHINA
NEW LOCOMOTIVES FOR CHINESE RAILWAYS
BOTOCAN HYDRO-ELECTRIC PLANT
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1913 to about 240,000 in 1919. In 1917 the Bank of Chosen was granted the right of issuing banknotes in Manchuria, and the Oriental Development Company extended their operation into Manchuria as an agent financing real estate.

In the early part of 1920, however, the world-wide financial panic visited Japan, and her trade with China shrank from Y.1,142,000,000 in 1919 to Y.720,000,000 in 1921. Most of the Japanese enterprises in China sustained a staggering blow; and the loans of the Yokohama Specie Bank and the Bank of Chosen in Manchuria, for instance, shrank from Y.143,000,000 in 1919 to Y.88,000,000 in 1920. The number of the Japanese residents in China diminished from 240,000 in 1919 to 220,000 in 1923.

In this widespread deflation period, three Japanese enterprises carried on further development. One of them was the South Manchuria Railway Company, and the second was the Japanese spinning mills in China. The third was the Japanese merchant marine in the China seas. The South Manchuria Railway Company not only withstood this storm of depression, but actually accomplished their expansion. Their nominal capital was increased from 200,000,000 to Y.440,000,000 in 1920, and the further development of their great enterprises was pursued, including the extension of the wharves, installation of new blast furnaces at the Anshan Ironworks and construction of the Ssupingkai-Taonan Railway.

About this time the Japanese spinning industry in China embarked upon a prosperous career. Owing to the revision of the Chinese customs tariffs in 1919, the export of Japanese cotton yarns to China decreased from Y.119,000,000 in 1920 to Y.68,000,000 in 1921. As an effective means of rescuing themselves from this predicament, the Japanese spinning mills established their branch mills in China, thus increasing the number of the Japanese-owned cotton spindles in China from about 330,000 in 1918 to 960,000 in 1923, which was further increased to 1,300,000 in 1925.

The third important enterprise that was largely expanded in China in spite of the depression above-mentioned, was the merchant marine in the China seas. The tonnage of the Japanese vessels making calls at Chinese ports, which fluctuated about 15,000,000 tons during the period from 1913 to 1918, began to increase phenomenally in 1919, and reached 20,000,000 ton mark in 1921, and finally reached 26,000,000 tons in 1925.

From the above some idea of the history of Japan's economic growth in China may be obtained. Next, how Japan's investments in China stand to-day?

Japanese Loans to the Chinese Government

Since the advance of the loans to the Hsinmintun-Mukden Railway and to the Kirin-Changchun Railway, Japan's loans to the Chinese Government kept increasing up to the time of the World War. Among them are the loans to the Postal Administration Department in 1911, the Liquidation Loan in 1913, etc. After the outbreak of the World War, the European nations were compelled to withdraw from loan-making to China, and Japan almost monopolized the loan market with her capital steadily accumulated during this period. During the three years from 1917 to 1919 she made loans to China amounting to Y.230,000,000. Thus Japan came to occupy the foremost place among the financial powers to China. After the European War, however, Japan made only a few railway loans to China, such as the Ssupingkai-Taonan, Peking-Suiyuan, and Kirin-Changchun railways, and there were other loans, but these were merely the conversions of old loans into new ones and loans for the defaulted payment of interest. In other words, Japanese loans to China came to a standstill.

Exact figures of the Japanese loans to China are difficult to obtain, but Table No. 2 may serve to give some idea of the amount of the loans made to the Chinese Government as they stood at the end of each year from 1909 to 1928.

TABLE 2

	Thousand Yen		*Thousand Yen*
1909	2,470	1919	324,272
1910	5,452	1920	296,754
1911	15,434	1921	299,736
1912	15,417	1922	330,953
1913	79,190	1923	336,018
1914	79,172	1924	335,341
1915	79,154	1925	411,830
1916	91,913	1926	411,086
1917	131,245	1927	391,797
1918	306,013	1928	388,481

Han Yeh Ping Iron Mine Loan

In 1903, a contract was concluded between the Yawata Ironworks of the Japanese Government and the Chinese Government for the purchase by the former of iron ores of the Tayeh Mine, owned and operated by the Han Yeh Ping Company. Since 1914 the financial administration of this mining company was taken over mostly by the Yokohama Specie Bank, who has loaned to this company up to this present time Y.34,101,000 secured mostly from the Savings Deposit Department of the Japanese Government, and from the Bank of Japan, to the extent of Y.2,294,000. None of these loans have been liquidated, and since June 1, 1930, these loans secured from the above Deposit Department of the Japanese Government and also from the Bank of Japan were transferred to the Treasury Department of the above Japanese Government Ironworks.

Yuhan Kungssu Loan

In 1917 the Japan China Commercial Company entered into a contract with the Taochung Iron Mines in South China, thereby securing to themselves the exclusive rights of purchasing and selling the iron ores produced by those mines. In 1920 the Yedamitsu Ironworks of the Japanese Government took over the rights of purchasing the above iron ores, and through the agency of the Yokohama Specie Bank and the Japan China Commercial Company, furnished to the above Taochung Iron Mines the loans secured from the Deposit Department of the Japanese Government. These loans are given in Table No. 3.

TABLE 3

Date	*Amount Yen*	*Liquidated Amount Yen*	*Standing Amount Yen*
December, 1920	1,500,000	239,104	1,260,895
February, 1923	400,000	44,818	355,181
March, 1923	2,850,000	319,329	2,530,670
Total	4,750,000	603,252	4,146,747

These loans were also transferred to the Treasury Department of the Japanese Government Ironworks after June 1, 1930.

Kiukiang-Nanchang Railway Loan

In April 1907, the Industrial Bank of Japan secured Y.1,500,000 from the Deposit Department of the Japanese Government and loaned it to the Kiukiang-Nanchang Railway. This loan was subsequently taken over by the Japanese owned Oriental Enterprise Company in 1909, and since then this Company has advanced more loans to the above named railway as enumerated in Table No. 4.

TABLE 4

Names of Loans	*Year of Issue*	*Liquidation Amount Yen*	*Standing Amount Yen*
Oriental Enterprise *vs.*			
Kiukiang-Nanchang Railway Loan	1912	5,000,000	5,000,000
Ditto, First continuation Loan	1914	500,000	500,000
Ditto, Second continuation Loan	1914	2,000,000	2,000,000
Ditto, Third continuation Loan	1918	679,650	679,650
Ditto, Fourth continuation Loan	1922	2,500,000	2,500,000
Total (standing at the end of 1927)		10,679,650	10,679,650

Of the outstanding amount of Y.10,679,650 mentioned in the above table, Y.7,500,000 is due to the Industrial Bank of Japan, which secured the above amount of loan from the Deposit Department of the Japanese Government.

Japanese Loans in Manchuria and Inner Mongolia

Table No. 5 shows the loans raised in Japan by the Chinese Government, Chinese business companies and Chinese individuals for the purpose of investing them in Manchuria and Inner Mongolia, from which you will see how these loans increased year after year.

TABLE 5

Japanese loans in Manchuria and Mongolia, standing at the end of each year of 1909 and 1912, and from 1916 to 1917.

Year	Railways Yen	Mining and Forestry Yen	Electricity Yen	Miscellaneous Yen	Total Yen
1909	320,000	—	—	—	320,000
1912	320,000	—	—	90,000	410,000
1916	5,320,000	2,134,000	—	1,590,000	9,044,000
1917	11,820,000	5,397,000	—	1,590,000	18,807,000
1918	41,820,000	38,397,000	235,000	2,169,529	82,621,000
1919	41,820,000	39,099,072	346,000	3,611,998	84,877,070
1920	73,820,000	39,099,072	346,000	3,711,998	116,977,070
1921	73,820,000	39,099,072	481,000	4,136,998	117,337,070
1922	73,820,000	40,471,572	771,000	4,415,725	119,478,297
1923	81,817,081	40,471,572	771,000	5,208,725	128,268,378
1924	87,179,526	44,394,358	771,000	5,438,725	137,883,609
1925	93,479,526	45,915,180	771,000	5,736,424	145,902,130
1926	93,479,526	49,714,816	771,000	5,870,424	149,838,766
1927	102,009,945	60,562,072	1,154,958	7,964,221	171,691,196

The South Manchuria Railway Company

In this connection it is to be seen that so far as the number of the foreign residents in China is concerned, the Japanese people and the Japanese business firms occupy the unrivalled majority, among the latter the most outstanding one being the South Manchuria Railway Company and the Japanese spinning mills located around Shanghai, Tsingtao, Hankow and in Manchuria. As a matter of fact, these two elements represent more than half of the Japanese investments in China. Moreover, during the time when other various Japanese enterprises were in financial difficulties following the panic of 1920, these two enterprises achieved a tremendous growth. The Table No. 6 will show the year-by-year increase of the invested capital of the South Manchuria Railway Company since 1907 when the company opened their business until 1926.

TABLE 6

Date	Total amount of paid-up capitals, debentures and reserves Yen	Date	Total amount of paid-up capitals, debentures and reserves Yen
1907 ..	134,763,791	1917 ..	290,537,713
1908 ..	179,515,777	1918 ..	318,079,995
1909 ..	181,979,681	1919 ..	417,189,653
1910 ..	238,382,932	1920 ..	507,408,401
1911 ..	220,879,995	1921 ..	550,778,001
1912 ..	230,466,344	1922 ..	596,347,308
1913 ..	244,504,801	1923 ..	634,153,320
1914 ..	252,061,949	1924 ..	638,393,099
1915 ..	259,646,067	1925 ..	703,320,745
1916 ..	268,011,634	1926 ..	742,264,009

Japanese Spinning Industry in China

As has been mentioned already, the Japanese spinning industry in Shanghai, Tsingtao, Hankow and Manchuria, made a rapid development after the World War, and at present it is among the most important Japanese interests in China proper. All the spinning enterprises are entirely private and are not aided by the Japanese Government. Naturally, their success depends upon the internal conditions in China, and is subject to the policies of the Chinese authorities. Table No. 7 shows the development of this industry.

TABLE 7

Number of Japanese Owned Cotton Spindles in China.

Year	Number of Spindles	Year	Number of Spindles
1911	75,263	1924.. ..	1,058,028
1916	155,872	1925.. ..	1,303,816
1918	333,864	1926.. ..	1,318,312
1923	961,489	1927.. ..	1,329,508
		1928.. ..	1,370,763

Japan China Steamship Company

The Japan China Steamship Company was formed by merging the four Japanese steamship operations on the Yangtze River, so that they might more effectively compete with other foreign vessels navigating on this river. During the World War, the Japan China Steamship Company achieved a rapid development and is now a successful competitor with the two big British shipping companies, Jardine, Matheson and Company and Butterfield and Swire Company. The Table No. 8 shows the development of this Japanese shipping company.

TABLE 8

Year	Paid-up capital Yen	Tonnage of vessels	Remarks
1907	8,100,000	-	
1908	8,100,000	-	
1909	8,100,000	-	
1910	8,100,000	-	
1911	8,100,000	-	
1912	8,100,000	27,398	
1913	8,100,000	27,398	
1914	8,100,000	27,398	
1915	8,100,000	32,926	
1916	8,100,000	31,472	
1917	8,100,000	34,505	
1918	10,125,000	36,084	Opened Osaka-Hankow line.
1919	10,125,000	34,519	
1920	10,125,000	34,531	Opened South China coast line from Shanghai to Canton.
1921	10,125,000	41,217	
1922	10,125,000	44,160	Opened Ichang-Chungking Line.
1923	10,125,000	45,556	Extended as far as Hsuchow.
1924	10,125,000	45,556	
1925	10,125,000	42,025	
1926	10,125,000	45,753	Opened North China line.
1927	10,125,000	45,589	
1928	10,125,000	47,163	

Japanese Banking Corporations in China

Table No. 9 will show the growth of the Japanese Banking Corporation in China.

TABLE 9

Year	No. of Head Offices	No. of Branch Offices	Capital Yen	Deposits Yen	Loans Yen	Net profits Yen
1916 ..	14	13	5,860,000	10,987,708	12,455,071	580,587
1917 ..	11	6	3,500,000	8,110,053	9,839,729	641,063
1918 ..	21	28	13,770,000	32,243,614	44,242,195	1,699,904
1919 ..	11	23	13,775,000	24,443,697	60,106,350	2,651,418
1920 ..	10	10	13,775,000	8,328,096	19,071,235	2,780,612
1921 ..	29	47	68,175,000	66,900,597	124,750,174	5,422,964
1922 ..	29	47	68,175,000	66,900,597	124,750,174	5,688,360
1923 ..	31	69	105,075,000	78,831,616	192,099,124	5,118,083
1924 ..	26	43	89,700,000	67,754,814	153,629,936	3,010,052
1925 ..	24	31	77,508,250	73,529,974	148,739,131	1,219,477

Japanese Firms in Manchuria and Inner Mongolia

These firms are shown in two categories. Table No. 10 shows those solely owned by Japanese, and Table No. 11 those joint concerns between Chinese and Japanese.

TABLE 10

(a).—Firms solely owned by Japanese

Year	Paid-up capitals Yen	Year	Paid-up capitals Yen
1906 ..	105,105,000	1917 ..	187,092,000
1907 ..	105,664,000	1918 ..	225,140,000
1908 ..	107,323,000	1919 ..	326,359,000
1909 ..	107,889,000	1920 ..	502,826,000
1910 ..	108,129,000	1921 ..	517,380,000
1911 ..	111,951,000	1922 ..	535,873,000
1912 ..	123,220,000	1923 ..	554,477,000
1913 ..	137,474,000	1924 ..	546,726,000
1914 ..	142,798,000	1925 ..	569,763,000
1915 ..	150,025,000	1926 ..	586,321,000
1916 ..	164,147,000		

(b).— Firms under Sino-Japanese joint management.

Year	Japanese capitals Yen	Chinese capitals Yen
1907	637,000	363,000
1908	1,127,000	613,000
1909	1,108,000	632,000
1910	1,110,000	630,000
1911	1,556,000	594,000
1912	1,556,000	594,000
1913	2,138,000	612,000
1914	2,042,000	520,000
1915	2,550,000	425,000
1916	2,813,000	674,000
1917	4,580,000	782,000
1918	9,371,000	1,170,000
1919	18,417,000	2,733,000
1920	40,751,000	5,881,000
1921	41,351,000	5,042,000
1922	43,398,000	5,344,000
1923	42,675,000	4,939,000
1924	41,013,000	5,056,000
1925	43,470,000	4,827,000
1926	36,390,000	4,222,000

Loans to the Chinese Government

The Table No. 12 shows all the loans made by Japan to the Chinese Government. This table is quoted from *Japanese Investment in China*, compiled by Mr. Masunosuke Odagiri, formerly Director of the Yokohama Specie Bank.

TABLE 12

Name of Loans	*Year of Issue*	*Standing amount at the end of 1928 Thousand Yen*
Japanese share of the Liquidation Loan	1913	49,880
Bank of Communications Loan	1917	29,794
Forestry and Mining Loan to Kirin and Heilungkiang Provinces, and loan for payment of its interest	1918-22	58,234
Advanced payment on Kirin-Kainei Railway Loan	1918	12,625
Advanced payment on Tsishun-Kaohsu Railway Loan	1918	25,600
Advanced payment on Four Railways Loan in Manchuria and Inner Mongolia, and loan for payment of its interest	1918-25	50,362
Loan for China's participation in the World War, and loan for payment of its interest	1918	38,895
Arsenal loan, and loan for payment of its interest	1917	62,443
Telegraph Loan, and loan for payment of its interest	1918-25	38,724
Ssupingkai-Taonan Railway Short Term Loan	1918	32,000
Ssupingkai-Chengchiatung Railway Loan	1916	4,780
Postal Administration Department Loan	1911	12,738
Peking-Suiyuan Railway Loan	1917-25	17,871
Advanced payment on Telegraph Improvement Loan, and loan for payment of its interest	1910-16	13,398
Telephone Improvement Loan, and loan for payment of its interest	1919-23	22,559
Japanese share of 9 per cent interest loan for the liquidation of foreign and domestic short term loans	1922	37,675
Printing Office Loan	1918	4,216
Copper Mint Loan	1910	5,410
Miscellaneous Loans		36,033
Total		553,237

Table No. 12 includes neither the Chinese Government Bonds handed over to Japan in redemption of the Shantung Railway, nor the Chinese Government Bonds issued in redemption of the Japanese Government properties at Tsingtao and the Japanese Salt Industry in Shantung, nor the Boxer Indemnity.

Loans to the Chinese Business Companies and Private Persons

There are no publications available at present, but according to Mr. Odagiri, the total amount of the loans of this kind is put at Y.177,240,000 at the end of 1928.

Direct Investments

The Table No. 13 is the list of the Japanese investments directly made in China proper and Manchuria. These figures show the total amount of the paid-up capital, debentures issued and reserves, as a rule, but in the case of the spinning industries and a few other industries, the estimated values of fixed assets were presented. The loans made by the Japanese banks are omitted.

TABLE 13

Descriptions	*Manchuria Yen*	*China proper Yen*	*Total Yen*
Agriculture and forestry	22,407,000	6,500,000	28,907,000
Mining	11,650,000	11,800,000	23,450,000
Power Plants	36,128,000	2,800,000	38,928,000
Manufacturing	105,611,000	196,688,000	302,299,000
Transportation	679,974,000	11,825,000	691,799,000
Financing	67,257,000	8,300,000	75,557,000
Commerce	117,753,000	45,890,000	163,643,000
Miscellaneous	51,243,000	3,134,000	54,377,000
Total	1,092,023,000*	286,937,000	1,378,960,000

* The total amount of Japan's investment in Manchuria alone, as it stood at the end of 1929, is put at Y.1,468,405,831, which is the latest available figure.

In this connection it is desired to draw your attention to the item of manufacturing in this Table No. 13. Of all the Japanese manufacturing industries in China, the most important one is the spinning industry. At the end of 1929, it counted 15 firms, with 40 mills, 1,442,840 spindles of untwisted yarns, 169,184 spindles of twisted yarns, 11,203 looms, and their fixed assets were estimated at Y.179,345,000. There is another item which merits your attention; the whole invested capital of the South Manchuria Railway Company was included in the figures under the caption of transportation in the Table No. 13, but as this company has invested in the various direct enterprises since their establishment, their investments are given in a separate Table No. 14.

TABLE 14

Fixed Capital of the South Manchuria Railway Company.

	Total of the invested amounts of enterprises standing at the end of fiscal year ending March 31, 1929 Yen
Railways	249,703,000
Workshops	7,579,000
Wharves and Harbours	69,204,000
Mining	106,719,000
Bean Oil Mills	4,936,000
Ironworks	20,871,000
Fertiliser Factories	80,000
Land Administration	167,169,000
Miscellaneous	45,490,000
Total	671,751,000

Japanese Culture Work

There is one more investment that Japan has made in China. It may not be proper to call it investment,—I mean our culture work. Table No. 15 will show what has been spent in that field. The investments in schools, hospitals, and other cultural works established and carried on by the Japanese Government in the Leased Territory in Manchuria and by the South Manchuria Railway Company are excluded from this table, because the former are the part of the governmental administration, and the latter were already included in the invested capital of that company in Table No. 14.

TABLE 15

	Yen
Special Budget Fund for the Cultural Work in China	59,270,000
Estimated assets of the Dojinkai Hospitals (Tungjenhui)	3,065,000
Estimated assets of the Dobun Shoin College (Tunga Tungwenhui)	1,382,000
Total	63,717,000

In conclusion let me present to you the sum total of the whole Japanese investments in China.

	Yen
Loans	730,477,000
Direct Investment	1,378,960,000
Culture Work	63,717,000
Grand Total	2,173,154,000

There are other loans in addition to the above, such as business loans made in China by the Japanese financial agents: the Yokohama Specie Bank; the Bank of Chosen; the Bank of Formosa; the Mitsui Bank; the Mitsubishi Bank; the Sumitomo Bank; the Oriental Development Company, etc., all of which have their head offices in Japan proper. Though no exact amount of such business can be ascertained, there is little doubt that it will amount to hundreds of millions of Yen. Furthermore, the Japanese Government properties in China are entirely omitted in this statement.

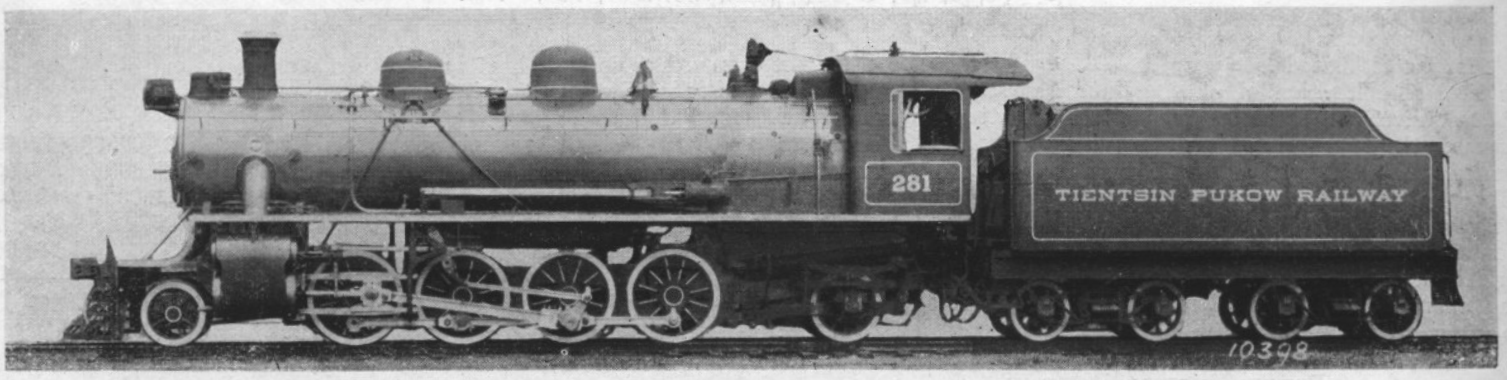
Finally, a few more words may be added as to the position China occupies in Japan's export market. Japan's export to China averaged during five years, from 1925 to 1929, Y.556,372,000 which is 26.6 per cent of her total exports. Incidentally, the Japanese exports to the United States of America averaged during the above-mentioned period Y.888,236,000 which is 42.5 per cent of her total exports. From this you will see Japan's absolute dependence for her economic life upon the China trade, as well as upon the American.

New Locomotives for Chinese Railways

(Specially Prepared for "The Far Eastern Review")

THE agreement to use the British Boxer Indemnity for the purchase of railway equipment manufactured in Great Britian, releases immediately £3,500,000, lying in the bank at Shanghai for this purpose. After educational grants of £465,000 are paid, the balance of the above sum is to be transferred to London to the credit of the Chinese Government Purchasing Commission to be used for the purchase of materials for the improvement and rehabilitation of the Chinese Government Railways. It is understood that the Chinese Government will also settle outstanding debts due to British merchants for railway materials, already supplied, which now amounts to over $20,000,000.

The British Government in 1922, agreed in principal to remit to China its share of the Boxer indemnity payments and since December 1, of that year, the payments have accumulated in the bank at Shanghai. On December 31, 1929, the total of these accrued annuities was £2,926,321. The annuities due under the agreement are as follows :—1921-31, £413,127 ; 1932-40, £596,481 ; 1941-45, £413,127 making a total of £10,176,931, available for railway rehabilitation, less the above mentioned amount for educational work. These funds are almost sufficient to rehabilitate the existing lines and complete the gap of 250 miles in the Canton-Hankow line.



Mikado 2-8-2, Type Locomotive Built by the Baldwin Locomotive Works for the Tientsin-Pukow Railway

Gauge	4′ 8½″
Cylinders	20″ × 28″
Valves	Piston, 11″ dia.

BOILER

Type	Straight Top
Diameter	65″ Inside
Working Pressure	200 lbs.
Fuel	Soft coal

Firebox

Material	Basic steel
Staying	Radial
Length	96 1/16″
Width	65½″
Depth, front	76½″
„ back	58¾″

Tubes

Diameter	5½″	2″
Number	24	139
Length	16′ 3″	16′ 3″

Heating Surface

Firebox	154 sq. ft.
Combustion chamber	48 sq. ft.
Tubes—5½″	546 sq. ft.
2″	1176 sq. ft.
Firebrick tubes	23 sq. ft.
Total	1947 sq. ft.
Superheater	443 sq. ft.
Grate area	43.5 sq. ft.

DRIVING WHEELS

Diameter, outside	54″
„ center	48″
Journals,	9″ × 11″

ENGINE TRUCK WHEELS

Diameter, front	36″
Journals	5½″ × 10½″
Diameter, back	42″
Journals	7½″ × 14″

WHEEL BASE

Driving	15′ 0″
Rigid	15′ 0″
Total Engine	31′ 10″
Total engine and tender	59′ 3″

WEIGHT—in working order

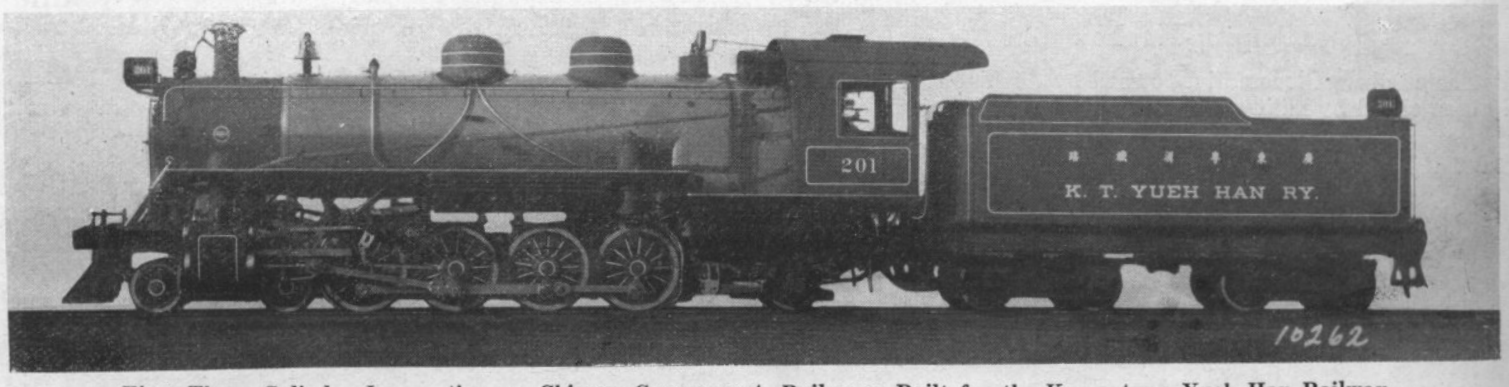
On driving wheels	147,300 lb.
One truck, front	20,900 lb.
On truck, back	36,600 lb.
Total engine	204,800 lb.
Total engine and tender	331,480 lb.

TENDER

Wheels, number	Eight
Wheels, diameter	36″
Journals	5″ × 9″
Tank capacity	5,500 Imp. gal.
Fuel capacity	9 tons (2,240 lb.)
Tractive force	35,300 lb.
Service	Freight

Built 1929

Equipped with Type "A" superheater, and air brake on all driving and tender wheels, with one 8½″ cross-compound pump.



First Three Cylinder Locomotive on Chinese Government Railways, Built for the Kwangtung Yueh Han Railway

Gauge	4′ 8½″
Cylinders (3)	17″ × 24″
Valves Piston	8″ dia.

BOILER

Type	Straight
Diameter	68″
Working pressure	195 lb.
Fuel	Coal

Firebox

Material	Basic Steel
Staying	Radial
Length	96¼″
Width	66¼″
Depth, front	72″
Depth, back	61″

Tubes

Diameter	5½″	2″
Number	27	160
Length	19′ 0″	19′ 0″

Heating Surface

Firebox	162 sq. ft.
Tubes 5½″	719 sq. ft.
2″	1,585 sq. ft.
Firebrick tubes	19 sq. ft.
Total	2,485 sq. ft.
Superheater	584 sq. ft.
Grate area	44.3 sq. ft.

DRIVING WHEELS

Diameter, outside	50″
Diameter, center	44″
Journals, main	9″ × 9″
Journals, others	8″ × 9″

ENGINE TRUCK WHEELS

Diameter, front	30″
Journals	5″ × 9″
Diameter, back	30″
Journals	6″ × 10½″

WHEEL BASE

Driving	13′ 3″
Rigid	13′ 3″
Total engine	30′ 10″
Total engine & tender	59′ 3½″

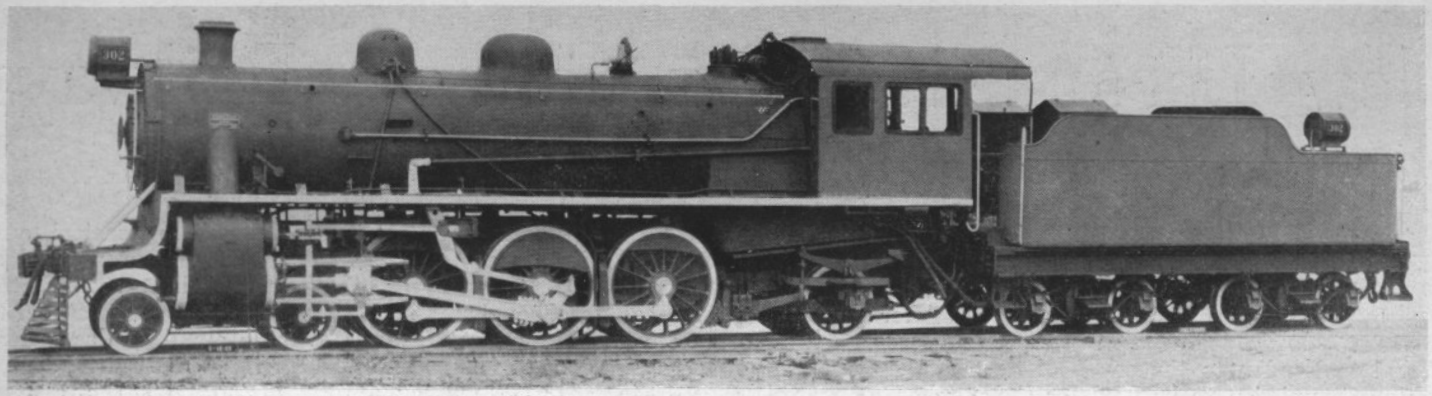
WEIGHT

On driving wheels	129,850 lb.
On truck, front	28,550 lb.
On truck, back	27,560 lb.
Total engine	185,960 lb.
Total engine & tender	316,620 lb.

TENDER

Wheels, number	Eight
Wheels, diameter	33″
Journals	3¼″ × 10″
Tank capacity	6,300 U.S. gals.
Fuel capacity	9 tons (2,240 lb.)
Tractive force	34,500 lb.
Service	Freight

Equipped with Type "A" superheater, power reverse, and air brake on all driving and tender wheels with one 11″ pump, left side.



Pacific Type Locomotive Built for the Kirin-Hailung Railway by the American Locomotive Company

SPECIFICATIONS: Gauge of Track—4′ 8½″; Cylinders—Diameter, 20″, Stroke, 26″; Driving Wheel Diameter, 62″; Boiler—Inside Diameter, 65″, Pressure, 180 lbs.; Fire Box—Length, 96½″, Width, 65½″; Tubes—Number, 133, 24 Diameter, 2″, 5½″, Length, 15′ 6″; Wheel Base—Driving, 11′ 0″, Engine, 30′ 7″, Engine and Tender, 57′ 9½″; Weight In working Order—Pounds, Leading, 40,500, Driving, 109,000, Trailing, 36,000, Engine, 185,500, Tender, 108,800; Fuel—Soft Coal; Evaporating Surfaces, Square Ft.—Tubes, 1,073, Flues, 520, Fire Box 192 Arch Tubes, 18, Total 1,803; Superheating Surface, Square Ft., 442; Grate Area, Sq. Ft., 43.6; Maximum Tractive Power—25,740 lbs.; Factor of Adhesion—4.23; Tender Type, 8-Wheeled; Capacity, Water, 5,000 Gals.; Fuel, 9 Tons.

It was estimated last year that the amount required for the physical rehabilitation of all the lines was approximately $60,000,000 silver or $25,000,000 gold, but continued warfare has increased the destruction of road bed and bridges and the deterioration of rolling stock to an extent that considerably augments the above figure. A full report on the rehabilitation requirements of the various Chinese Government railways was made by Mr. R. B. Mantell, the American operating expert engaged by the Ministry for this purpose. The reports of each individual line cover all the physical needs from road bed to workshops. Confining our extracts to locomotive rehabilitation, the report on the various railways says :—

PEKING-MUKDEN RAILWAY

This line has a total of 251 locomotives as follows :—

Under age 10 years ...	No. 103	20-29 ,, ...	No. 32
10-20 years, ...	,, 23	29-35 ,, ...	,, 56
		Over 36 years,	,, 37

There are 93 engines with an age of 29 to 41 years, representing a total tractive effort of 1,640,819 lbs. These were recommended to be scrapped, and 15 to 20 new Mikado type of 50,000 to 60,000 lbs tractive effort purchased. The cost for purchase of new engine power and rehabilitation of existing engines is estimated as follows:–

15 Mikado locomotives (Mex $120,000 each) ...	$1,800,000
85 engines rehabilitated at (Mex $5,000 each) ...	425,000
	$2,225,000

Peiping-Hankow line

The number of locomotives owned by this line is 229, of which 119 been seized by military leaders for operating their troop trains on other lines or held in Manchuria as spoils of war. The cost of rehabilitation of existing engines and purchase of new engines is placed as follows :—

Repairing 25 shunting engines at	$2,000	$ 50,000
General overhaul 112 goods engines at ...	$5,000	560,000
,, ,, 16 French passenger locos @	$5,000	80,000
,, ,, 15 Belgian ,, ,, @	5,000	75,000
Purchase of 15 new engines @ $100,000		1,500,000
		$2,265,000

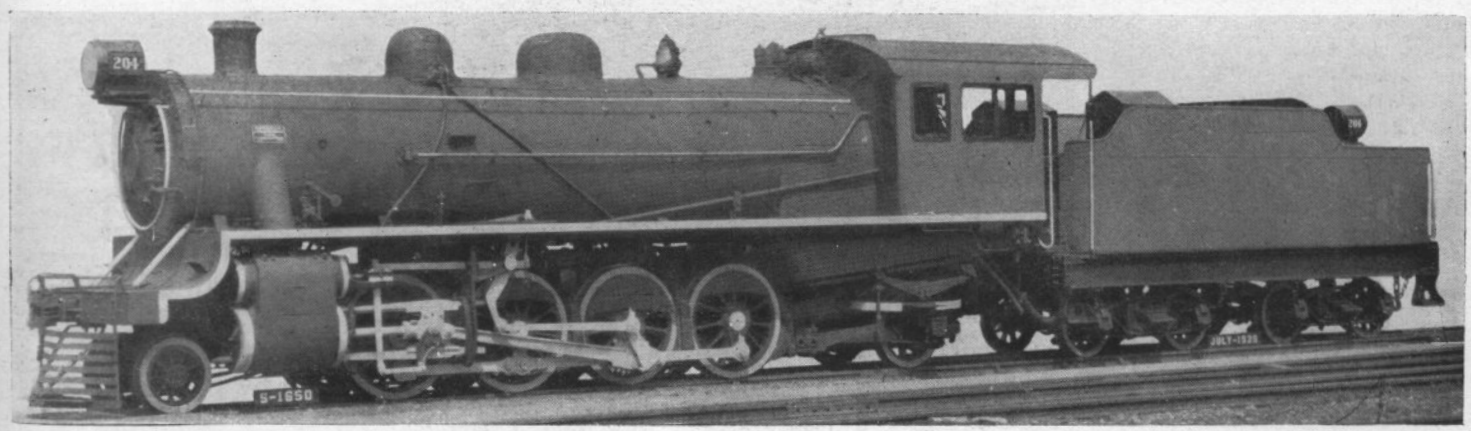
Canton-Hankow Railway, Northern Section

The rehabilitation for the locomotives of this line is estimated as follows :—

7 *Shunting engines* built 1910-1911-1916, tractive effort between 14,344 and 196,252 lbs.	$14,000
19 *Goods engines* built between 1912 and 1927, tractive effort between 25,543 and 37,752 lbs. ...	$66,500
8 *Passenger engines* built between 1916 and 1920, tractive effort between 23,600 and 26,600 lbs. ...	$28,000

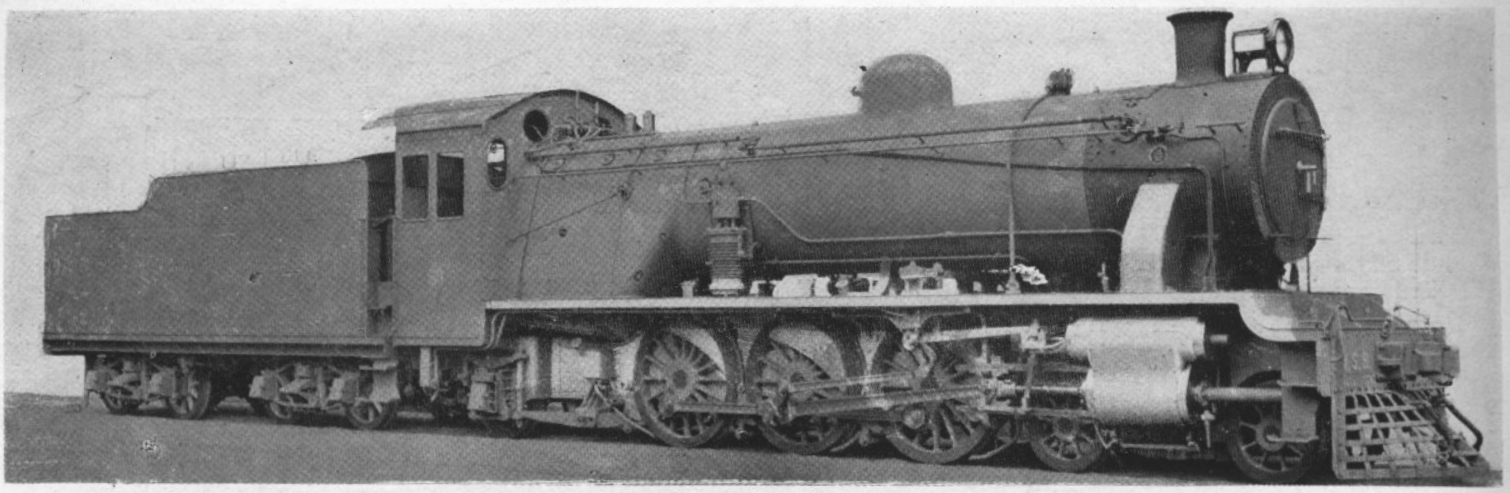
PINGSHIANG BRANCH

8 *Shunting engines*, built in 1904, should be scrapped	——
7 *Engines*, built between 1902 and 1913, half of these engines should be scrapped after branch line bridges are put in shape for heavier power	——
7 Engines @ $2,000	$14,000
	$122,500

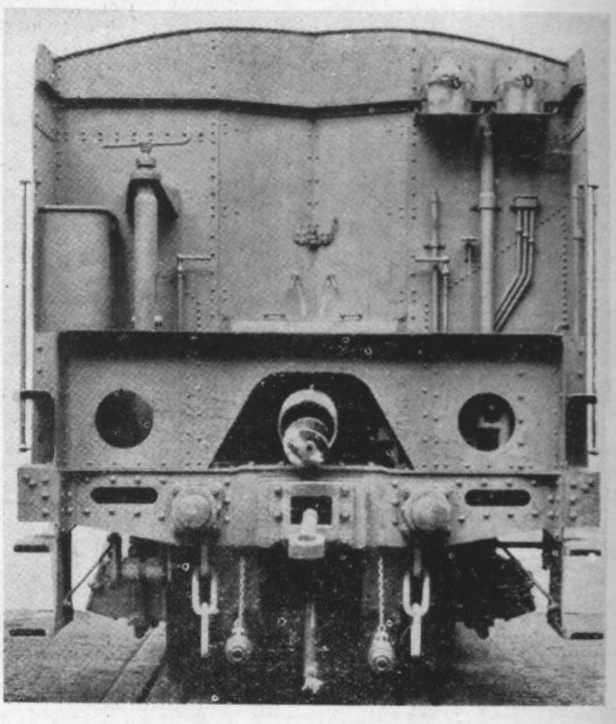


Mikado Type Locomotive Built for the Kirin-Hailung Railway by the American Locomotive Company

SPECIFICATIONS :,Gauge of Track—4′ 8½″; Cylinders—Diameter, 20″, Stroke, 28″; Driving Wheel Diameter, 52″; Boiler—Inside Diameter, 65″, Pressure, 180 lbs.; Fire Box—Length, 96½″, Width, 65½″; Tubes—Number, 133, 24, Diameter, 2″, 5½″, Length, 15′ 6″; Wheel Base—Driving, 14′ 3″, Engine, 30′ 9″, Engine and Tender, 57′ 11½″; Weight In Working Order—Pounds, Leading 18,000, Driving, 138,500, Trailing, 34,000, Engine, 190,500, Tender, 108,800; Fuel—Soft Coal; Evaporating Surfaces, Sq. Ft.—Tubes, 1,073. Flues, 520, Fire Box, 192 Arch Tubes, 18, Total 1,803; Superheating Surface, Sq. Ft., 442; Grate Area, Sq. Ft., 43.6; Maximum Tractive Power, 32,950 lbs.; Factor of Adhesion—4.2; Tender Type—8-Wheeled; Capacity, Water, 5,000 Gals; Fuel, 9 Tons.



General View of 4-6-2- Type Locomotives for the Nanking-Shanghai Railway supplied by the North British Locomotive Co., Ltd. Front End View of Engine (Left) and Front End View of Tender (Right) showing Mechanical Stoker Connections. Bottom: View of Cab, Showing Fittings and Mechanical Stoker Connections



Canton-Hankow Railway, Southern Section

The Railway owns :—23 Locomotives built between 1907 and 1929.

6 Shunting engines built in 1907, 14,340 lbs. tractive effort, two of them being in such poor condition that they should be scrapped.

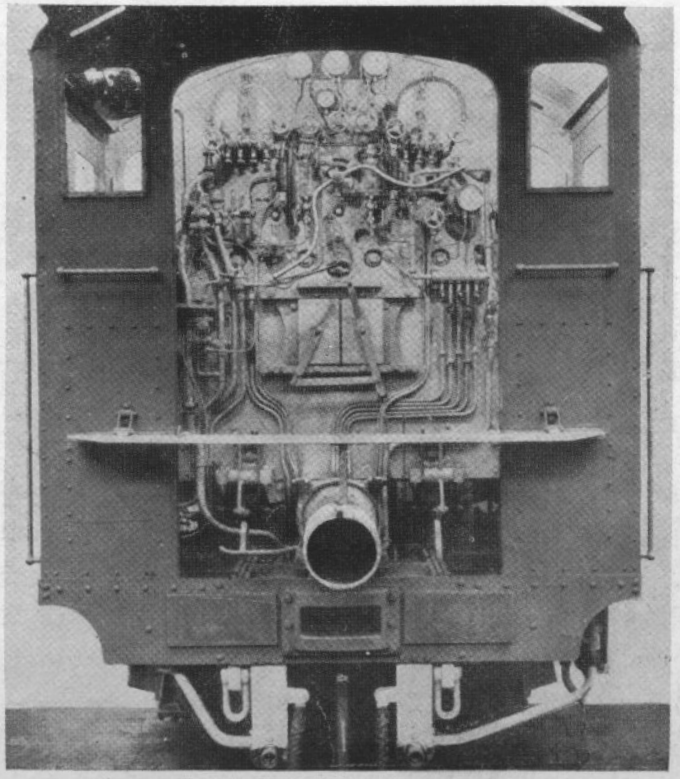
6 Mogul engines built in 1909 ; 24,100 lbs, tractive effort.

2 Mogul engines built in 1922 ; 25,640 lbs. tractive effort.

5 Composite engines built in 1914 ; 31,820 lbs. tractive effort.

4 Mountain type engines ; 34,500 lbs. tractive effort ; recently delivered.

Including the four new engines there are a total of eleven engines in service. The engines out of service need general overhauling, and the Railway lacks facilities to make repairs of this nature. Seventeen engines should be overhauled at $4,500 per engine. Total cost : $76,500.



Shanghai-Nanking and Shanghai-Hangchow-Ningpo lines

The purchase of six locomotives of the Mountain type with a tractive effort of 45,000 lbs. was recommended.

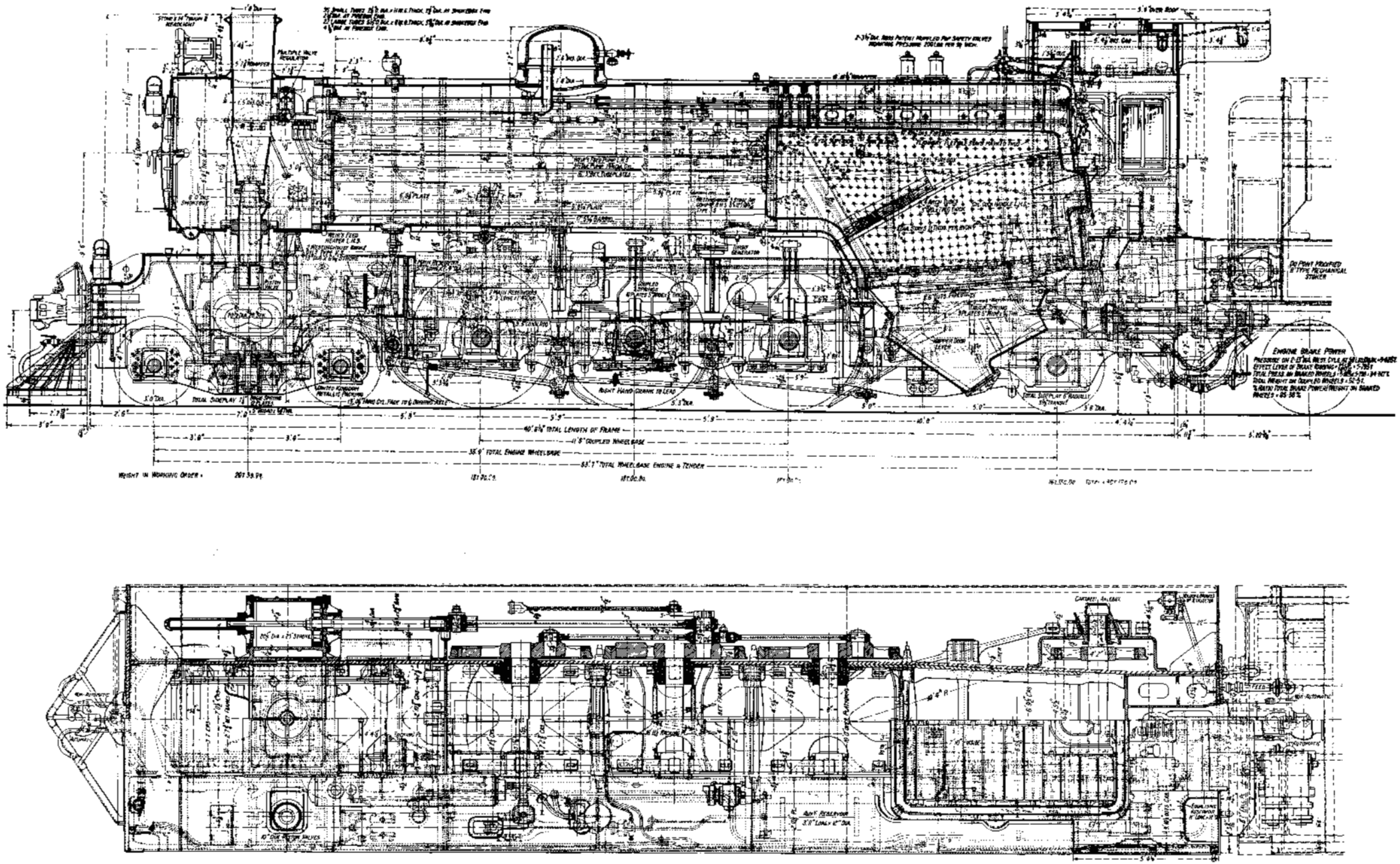
Tientsin-Pukow line

An inspection of all the locomotives of this line shows that they could be put in first class condition for $318,000.

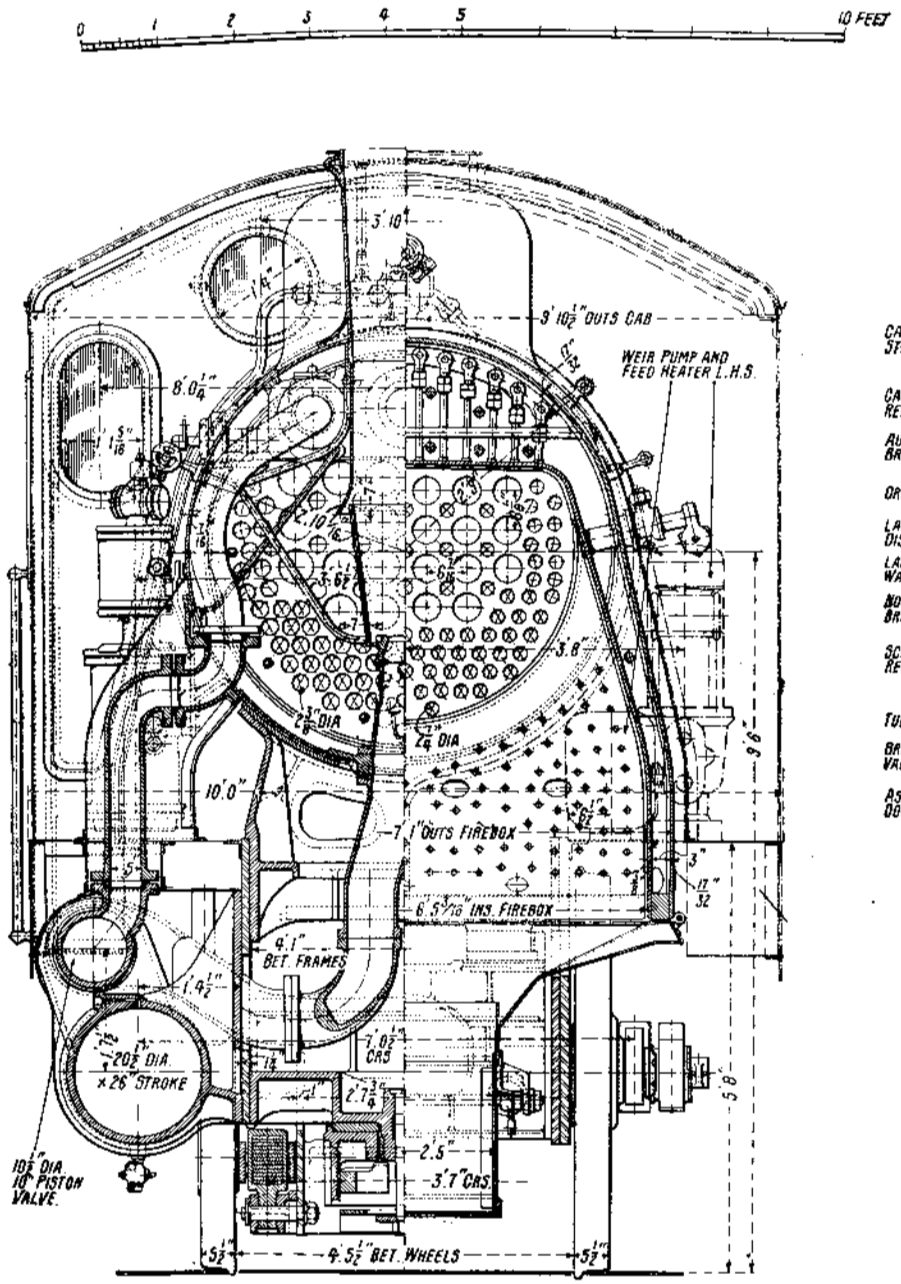
Peiping-Suiyuan Railway

Locomotives.—The locomotives of this Line amounts to 138, of which thirty-five were delivered between 1905 and 1909, and consist of 15 shunting engines, 10 Mogul engines (built at Tangshan works), 6 Shay gear type locomotives, 4 Mallet type (North British Works).

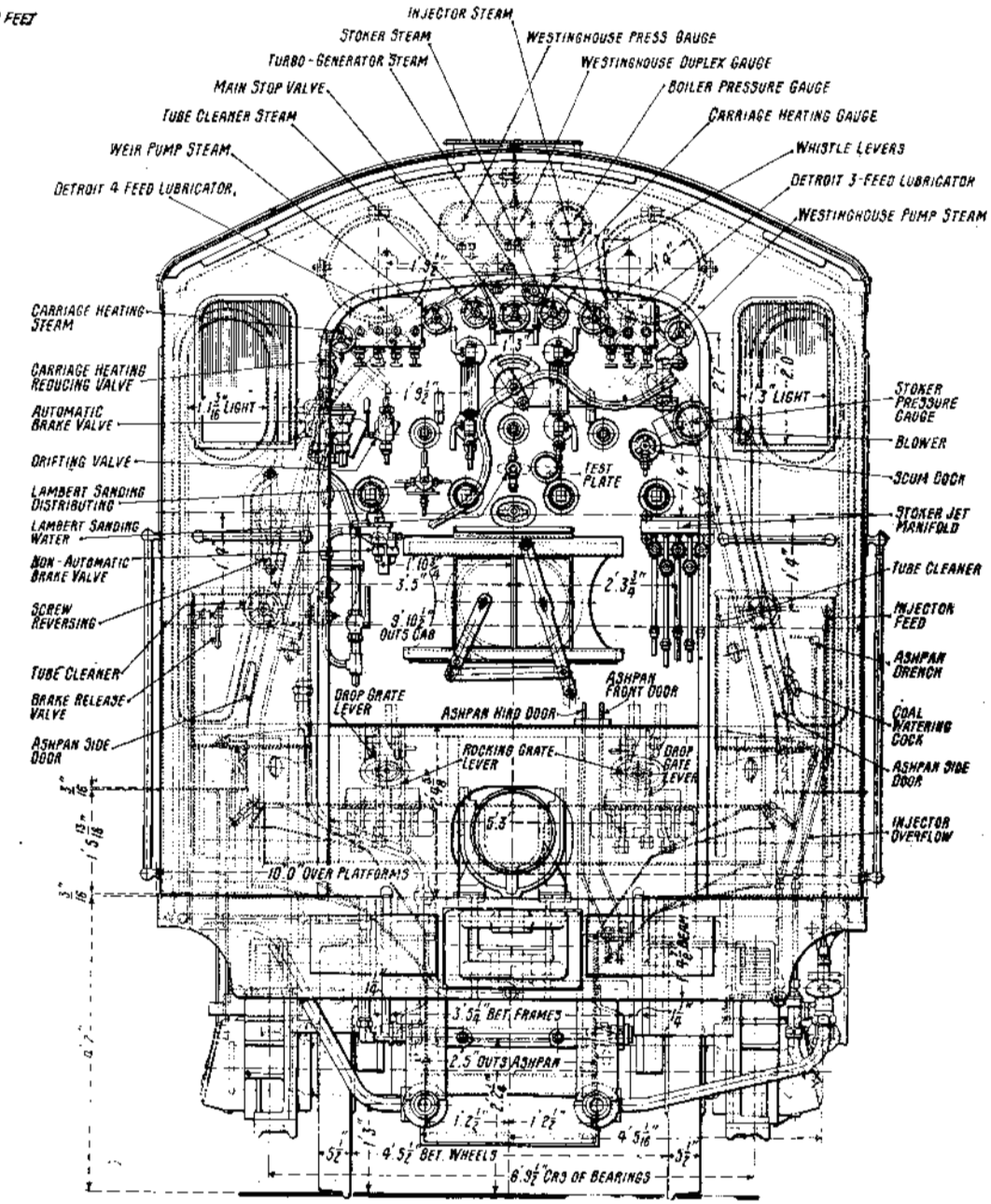
The balance, delivered between 1909 and 1922, consist of, 18 Mallet


40'6⅛" TOTAL LENGTH OF FRAME
11'6" COUPLED WHEELBASE
35'9" TOTAL ENGINE WHEELBASE
63'7" TOTAL WHEELBASE ENGINE & TENDER
RIGHT HAND CRANK TO LEAD
ENGINE BRAKE POWER

Sectional Elevation and Plan of 4-6-2 Mixed Traffic Locomotive for the Nanking-Shanghai Railway. Built by the North British Locomotive Co., Ltd. Glasgow
(Reproduced from "The Railway Gazette," Nov. 1930)



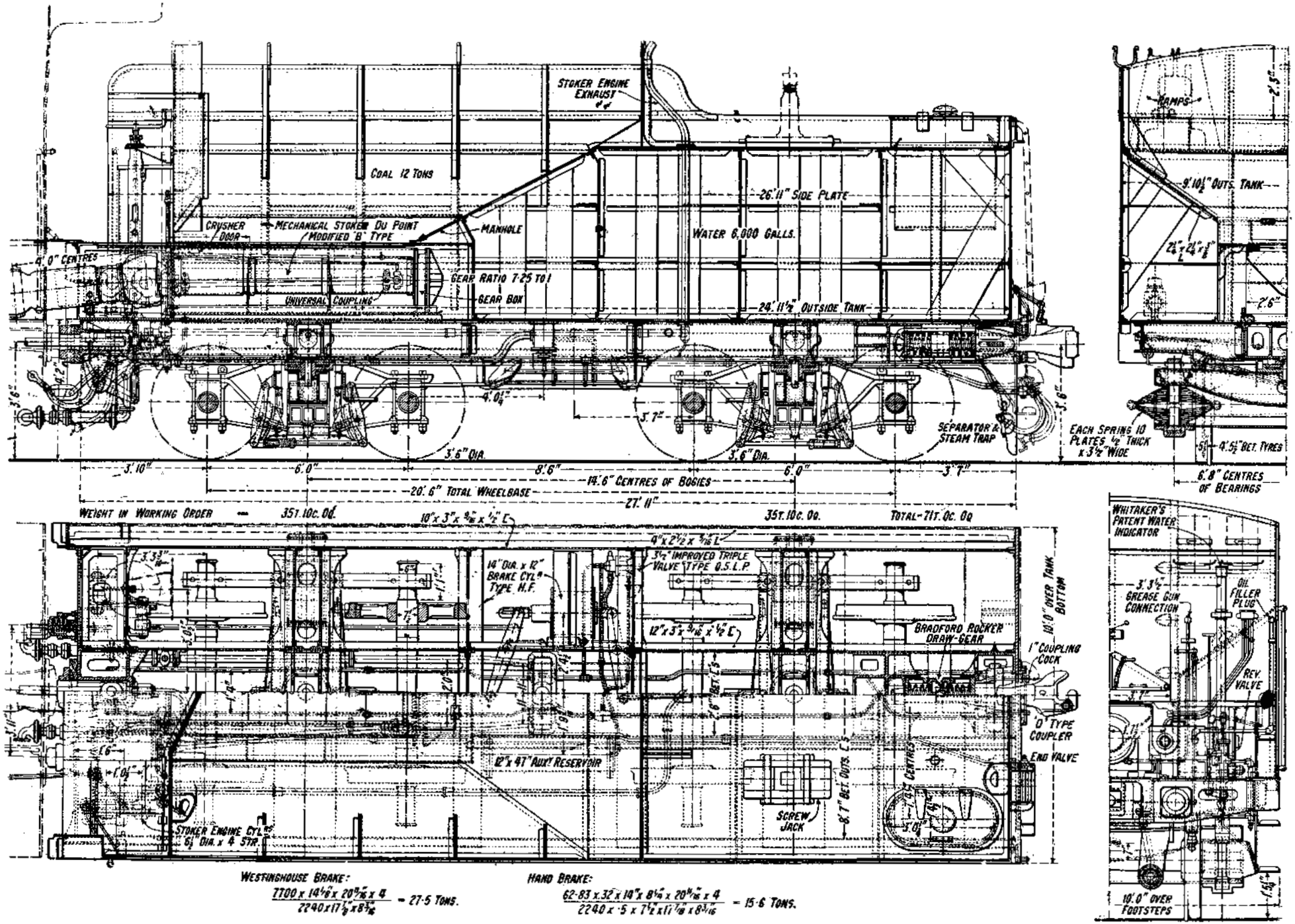
Half Cross Sections of Engine



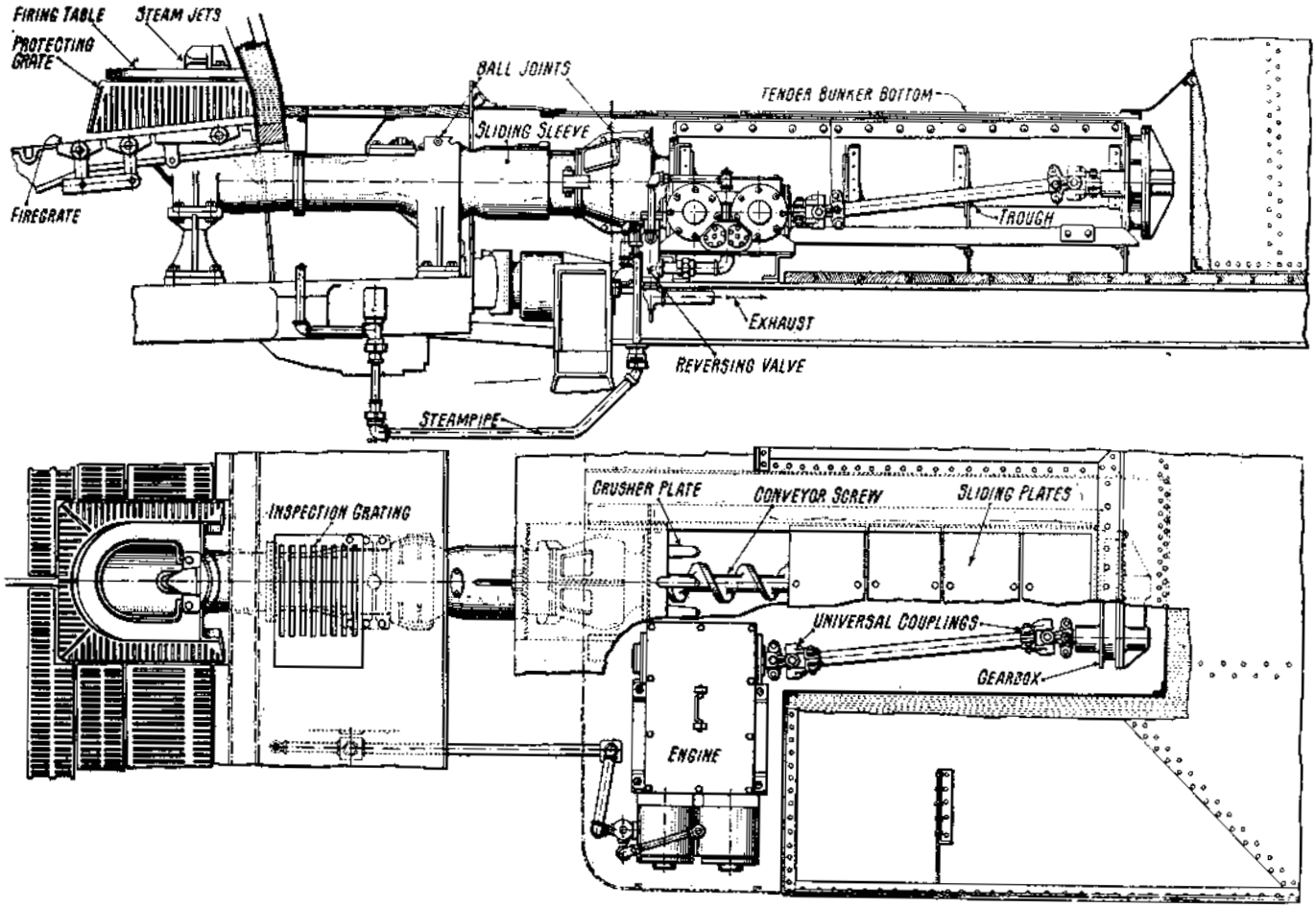
Engine Cab, Showing Fittings and Mechanical Stoker Connections

New 4-6-2 Type Locomotives for the Nanking-Shanghai Railway, Built by the North British Locomotive Co., Ltd.

(Reproduced from "The Railway Gazette")



Sectional Elevations and Plan of Mechanical-Stoker Equipped Tender, 4-6-2 Type Locomotives for the Nanking-Shanghai Railway. Built by the North British Locomotive Co., Ltd., (Reproduced from "The Railway Gazette")



Details of Mechanical Stoker with Engine and Tender Connections; 4-6-2 Locomotives for the Nanking-Shanghai Railway. Built by the North British Locomotive Co., Ltd., (Reproduced from "The Railway Gazette")

type engines, 13 shunting engines, 20 Pacific type passenger engines, 6 consolidated engines, 46 Mikado engines.

Of the total ownership of the engines of this Railway, 53 are located in Manchuria north of the Wall, and consist of, 1 Shunting engine built in 1905, 10 Mogul type engines, 2 Shunting engines built in 1909 and 1921, 19 Pacific type engines, 21 Mikado engines.

It was assumed that all these engines will be returned to the Peiping-Suiyuan Railway, and the recommendations in connection with rehabilitation cost, and charges for improvement are as follows :—

3 Shunting engines built in 1906. These engines should be scrapped, and it should not be necessary to replace same.

6 Shay gear locomotivas built in 1909. These engines are absolutely unsuitable for operation on a line of this kind, and have not been in use for a long time. They should be scrapped.

4 Baldwin Mallet engines built in 1911. These engines have a tractive effort of only 27,400 lbs., and should not be perpetuated. The very light tractive effort combined with high cost of maintaining two engines in one, and the loss of efficiency due to their construction, etc., indicates that these engines should be scrapped.

4 North British locomotives of the Mallet type, built in 1908. These engines have a tractive effort of 56,407 lbs., and do not warrant being kept in service on account of heavy repair costs and light tractive effort which can be secured in one engine unit.

Total engines recommended to be scrapped :—17.

It was recommended that the other engines be perpetuated until such time as the line between Suiyuan and Paotow develops sufficient traffic to warrant the expenditure of money for heavier locomotive and heavier bridges. Of the 55 engines located north of the Wall, 42 are serviceable, and 11 were found to be unserviceable.

Considering a proper charge to rehabilitation affecting the engines north of the Wall, both serviceable and unserviceable, and engines on this railway that should come under this heading, it is estimated that sixty engines are in need of general overhauling, at an approximate average cost of $5,500 per engine, (including Mallet type), Total—$390,000.

Kiao-Tsi Railway

No recommendations were made for the purchase of new locomotives for this line as the increase of traffic will absorb all surplus engines.

Chinese Eastern Railway

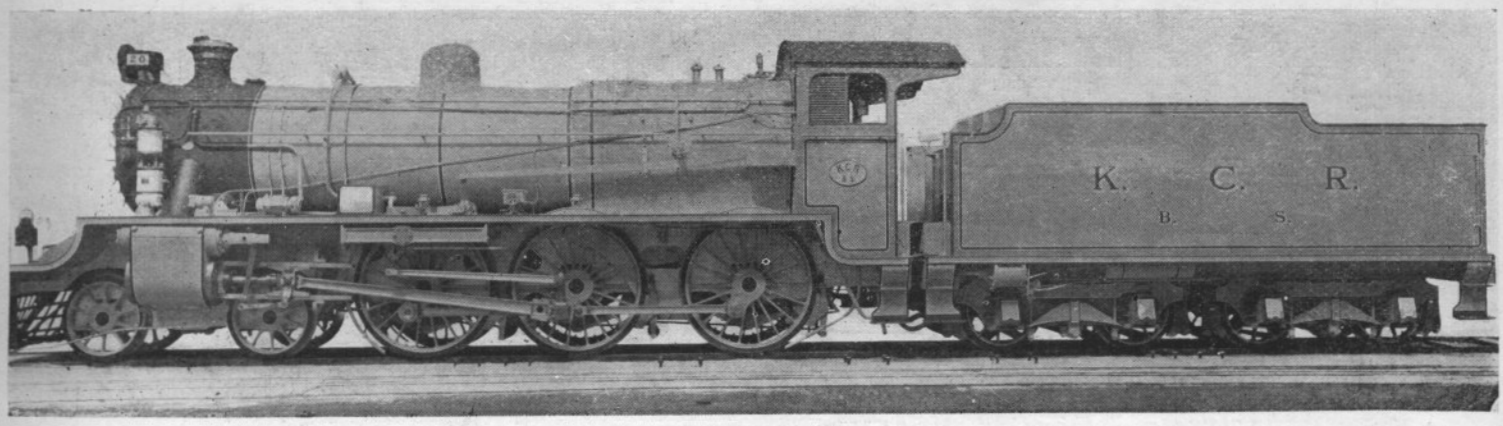
According to the latest reports, the Chinese Eastern Railway owns a total of 508 locomotives, of which 151 are in service and 244 are under repairs, the remaining 113 being beyond repair. There are 83 locomotives for passenger and goods traffic ; 209 are ten-wheeled, 13 eight-wheeled, 124 Decapods and 18 tank types. Owing to the political complications over the management and future status of the line, the Soviet directors are apparently making no effort to bring the rolling stock up to traffic requirements, while the monthly deficit in operating revenues is compelling the line to borrow from the banks to meet current expenses. The above figures would indicate that this line will be in the market for a large number of locomotives as soon as some definite agreement is arrived at between China and Russia. It may be, however, that the bulk of these requirements will be supplied from the Soviet Shops in Russia.

These reports of last year would indicate that the actual sum necessary to purchase new locomotives and repair existing ones, did not exceed $6,000,000 silver. Additional deterioration as a result of the civil wars combined with the enormous depreciation on the value of silver, will probably bring this total to at least ten million dollars at the present time.

Under the conditions that prevailed last year, that the Ministry of Railways has been able to make any substantial progress in the betterment of its lines is a high testimonial to the character of the men who are directing its affairs at Nanking. New locomotives and rolling stock have been acquired as finances have permitted, but the sum total of these purchases does not begin to cover even the urgent requirements of the lines. The early release of the British Boxer funds will enable the Ministry to proceed with locomotive replacement and repairs and once more place the existing railways in a position to handle the traffic of the country. The purchase of

4-6-0- TYPE LOCOMOTIVE FOR THE GOVERNMENT OF HONGKONG

Constructed by Messrs. Kitson and Company, Limited, Engineers, Leeds



locomotives by the Ministry of Railways these past few years has been overshadowed by the orders placed for the new lines in Manchuria. Most of these orders went to the Skoda Works of Prague (Czechoslovakia) and were distributed as follows :—

Hulan-Hailung Railway ...	...	7 Mikado Type	(2-8-2)
Chinese Eastern Railway ...	...	6 Tank Type	(2-10-2)
Tsitsihar-Keshan Railway .	...	24 Mikado Type	(2-8-2)
Ssupingkai-Taonan Railway	...	4 do.	(,,)
Mukden-Hailung Railway ...	...	24 do.	(,,)

Generally, it may be said that in the last few years the Skoda Works supplied all needs of the Railways in Northern Manchuria, with the exception of one Tank Type (2-10-2) locomotive for the Chinese Eastern Railway, four Pacific Type (4-6-2) locomotives for the Ssupingkai-Taonan Railway, supplied by the Mitsubishi-Kobe and the S. M. R. Workshops, Dairen, respectively, and four Mikado Type (2-8-2) Belgian locomotives for the Ssupingkai-Taonan Railway. About a dozen or so rebuilt old locomotives which had been in service at the front, were supplied by a British Importer to the Mukden-Hailung Railway.

Outside of these orders, the only important purchases were ten Baldwin Mikado (2-8-2) Type locomotives for the Tientsin-Pukow Railway ; two Baldwin 3-cylinder type for the Kwangtung Yueh-Han Railway, and the Mikado and Pacific types furnished to the Kirin-Hailung line by the American Locomotive Company. In addition to the above the North British Locomotive Company has furnished the Nanking-Shanghai line with eight (4-6-2) Pacific type engines and Kitson and Company, Ltd., have supplied the Hongkong Government with three locomotives for the through passenger service of the Canton-Kowloon line. Belgian makers supplied ten locomotives in 1929 (six for the Lung-Hai and four for the Shanghai Nanking Line) and four more in 1930 for the Shanghai-Nanking line. These locomotives, all of the consolidated 2-8-0 type, were financed from the remitted Belgian Boxer indemnity funds and built by The Ateliers Metallurgiques de Tubize. This makes, a total of 86 locomotives for Manchuria, and 37 for lines south of the Wall.

The British Boxer fund for railway rehabilitation is already being drawn upon by the Ministry of Railways for the purchase of material. A sum of £500,000 out of the Indemnity funds has been alloted to the Tientsin-Pukow Railway administration as a loan to be replaced in four years out of earnings with five per cent interest charges. The reorganization plan for this line provides for the purchase of eight new Pacific type locomotives and a number of passenger coaches.

As noted in the last issue of *The Far Eastern Review* an order for four locomotives for the Kao-Tsi (Shantung) Railway was recently awarded to the Mitsui Bussan Kaisha. These engines will be built at the Shakako Works of the South Manchuria Railway near Dairen. Two years ago, the same works completed an order for four Pacific type locomotives for the Ssupingkai-Taonan Railway.

The use of the British Boxer Indemnity for the improvement of Chinese Government lines will restore to British manufacturers their supremacy in equipment of all lines originally built from the proceeds of British loans, an equitable arrangement which the manufacturers of other nations cannot fairly criticise. In our opinion, under the old form of railway loan agreements, the Chinese were morally, if not legally bound to purchase the materials for the various loan built lines from the manufacturers of the nation supplying the funds, and we have always deprecated attempts to circumvent these obligations.

The breaking down of spirit of the loan agreements has resulted in the Americans holding the bag, while the British are again in a dominant position to supply the requirements of these lines and assured of cash payments against shipping documents, and a settlement of outstanding obligations, while the American debts remain to be paid under some form of consolidated loan, or an agreement as to new credits.

The placing of an order for new locomotives and rolling stock for the Kiao-Tsi railway with Japanese manufacturers, is another indication that the future requirements of this line, will be purchased in Japan. Another equitable arrangement which no one can object to as long as the railway debt to Japan remains unpaid.

We are able to reproduce with this article the photos and descriptions of the various new locomotives furnished the Chinese railways in the last two years.

MIKADO TYPE (2-8-2) LOCOMOTIVES FOR MANCHURIAN RAILWAYS :

Sixty-five 2-8-2 type locomotives especially built for extreme winter conditions of North Manchuria have been supplied to the Chinese owned railways in Manchuria by the Skoda Works of Prague, Czechoslovakia. These locomotives which were originally built for freight traffic, have shown themselves adaptable for fast train hauling and also heavy freight trains. They are now being used by these railways as mixed-traffic locomotives.

They are of standard gauge, with cast steel frames. The cylinders are 525 mm. dia. with a stroke of 710 mm working pressure 13 at. (191 lbs/sq. in.) At maximum boiler pressure the tractive effort amounts to 34,000 lbs. the factor of adhesion being 4.05. The valves are of the piston type, equipped with Heusinger-Walshaert gear. The diameters of the bogie wheels are 840 mm, of the driving wheels 1.400 mm and of the trailing wheels 1.000 mm. The driving wheelbase is 4.500 mm, the engine wheelbase 9.300 mm, the tender wheelbase 5.740, the total wheelbase 17.660 mm. The weight on the driving wheels in working order is 62.4 tons, while the total weight of the engine and tender is 135.5 tons.

The boiler is of the straight top type, telescopic, consisting of three rings, the inside diameter of the front ring being 1.600 mm. The firebox is 2.278 mm. × 1.580 mm. at grate surface. The total evaporative surface of the boiler amounts to 190.7 sq. meters out of which 172 sq. m. is taken by the tubes. Friedmann re-starting injectors and feed water heaters form a part of the equipment. The grate is of the rocking type.

Brakes of the Westinghouse type are fitted to these engines. Braking is applied to all driving wheels, the rigging being equalized. The same type of brake is fitted to the tenders.

The cylinders and valves are lubricated from the cab, by a pressure lubricator of the Friedmann Type R.

The tender has two bogies with wheels 1.000 mm. dia ; the bogie wheelbase is 1.840 mm, the total wheelbase is 5.740 mm, the total length of the tender is 7.340 mm, and the total length of

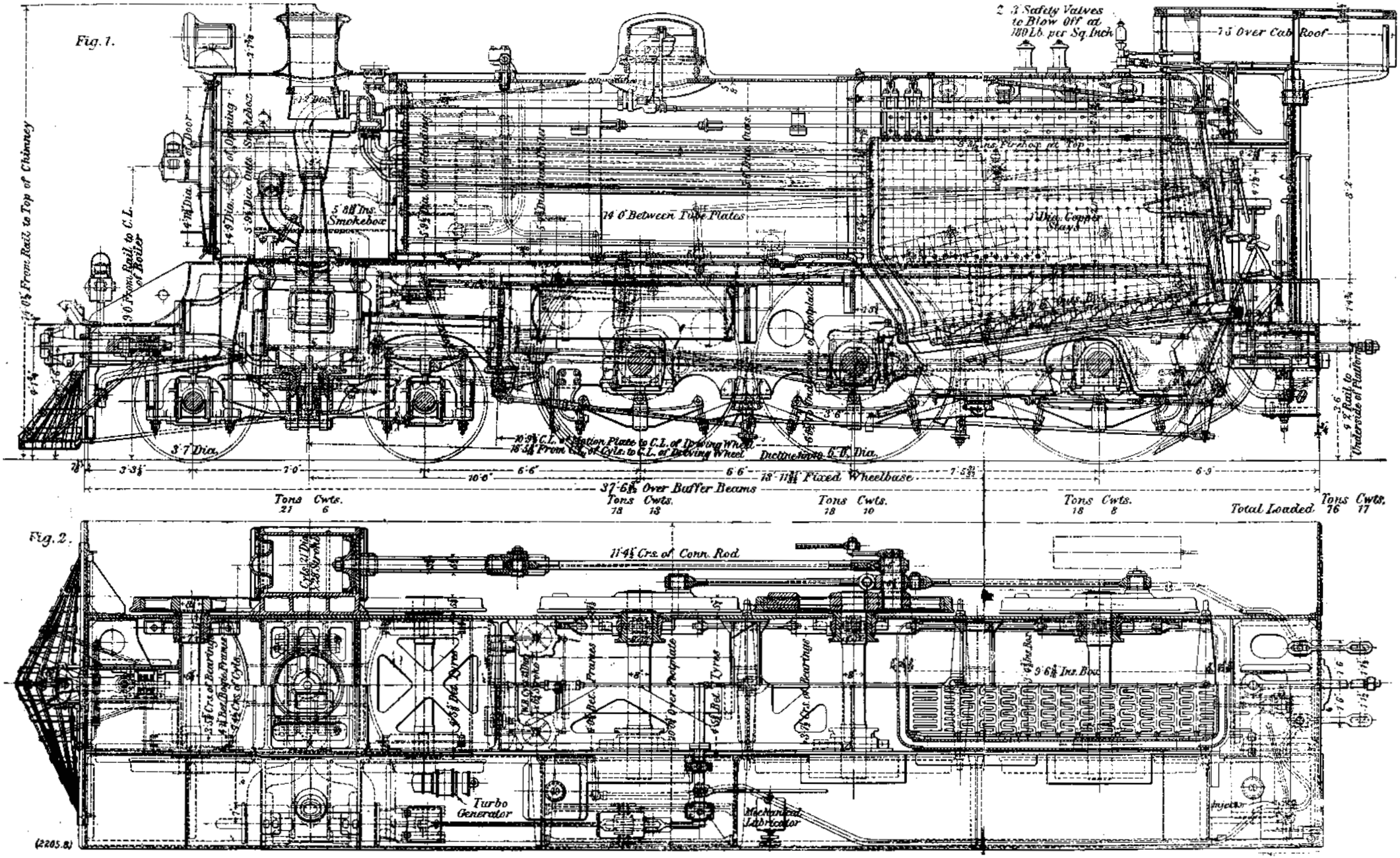


Fig. 1.
2 3 Safety Valves to Blow Off at 180 Lb. per Sq. Inch
7 5 Over Cab Roof
14 6 Between Tube Plates
Dia. Copper Stays
5 Rows Firebox at Top
5' 8" Ins. Smokebox
3' 7" Dia.
Tons Cwts. 21 6
Tons Cwts. 18 18
Tons Cwts. 18 10
Tons Cwts. 18 8
Total Loaded Tons Cwts. 76 17
Fig. 2.
11' 4½" Crs. of Conn. Rod
Turbo Generator
Mechanical Lubricator

Sectional Elevation and Plan of the 4-6-0 Type Locomotive for the Government of Hongkong, (Reproduced from "Engineering")

Fig. 3. Fig. 4

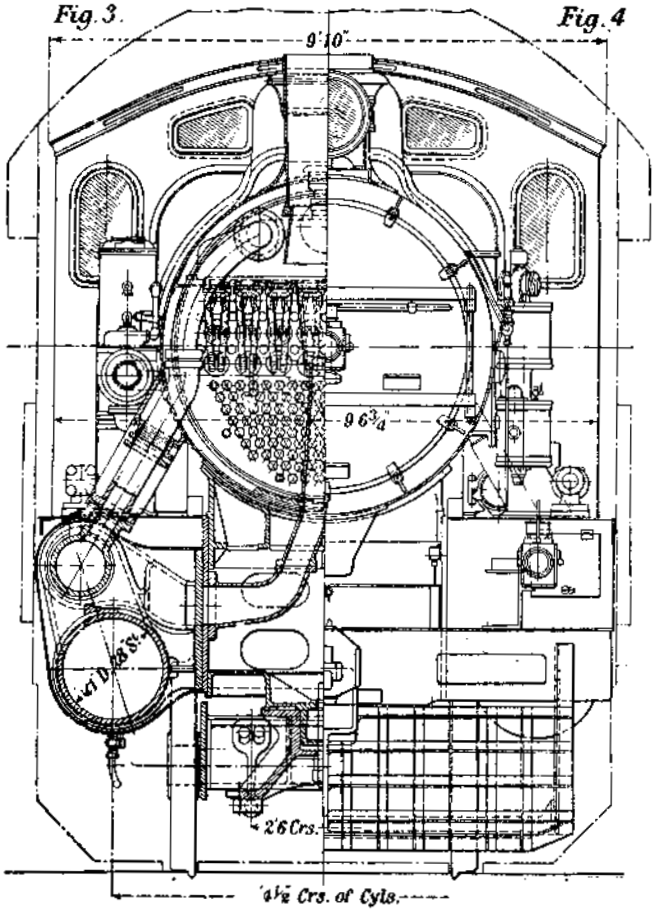
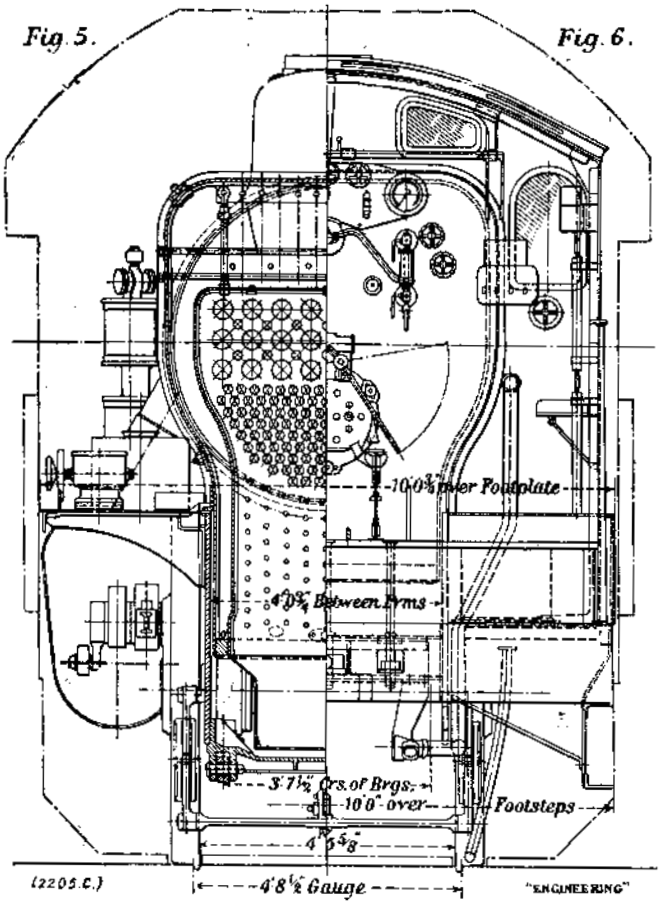


Fig. 5. Fig. 6.



(Reproduced from "Engineering")

HEATING SURFACE	Sq. Ft.
Firebox	192.6
Tubes (136-2"Outs.Dia.)	990.0
" (24-5½" " ")	463.7
Total Evaporative	1646.3
Total	1976.3
Grate Area	32.0

TENDER

Water Capacity 6000 Galls.
Fuel " Coal 5 Tons

Cylinders 21" Dia. × 28" Stroke
Dia. Coupled Wheels 6'-0"
Boiler Pressure 180lb. per Sq. Inch

engine with tender is 20458 mm. The tender has a capacity of nine tons of coal and 5,000 gallons of water.

The locomotive is supplied with automatic pocket couplers, adjustable to the heights of couplers on freight cars, used by the various railways in northern Manchuria.

The usual engine equipment includes two headlights and cab-lighting with a Pyle National Generator Outfit.

4–6–0 TYPE LOCOMOTIVE FOR THE GOVERNMENT OF HONGKONG.

Messrs. Kitson & Company, Limited, Airedale Foundry, Leeds, have recently constructed three locomotives for through passenger service between Hongkong (Kowloon) and Canton. The engines were purchased by the Government of Hongkong on behalf of the Government of the Kwangtung Province. These are stated to be among the heaviest engines of their type in use in southern China, and are intended to work trains of 400 tons weight exclusive of engine and tender, at a speed on the level of 50 m.p.h. Gradients of 1 in 100 and 1 in 150 have to be traversed. The engines have been built to the order and under the supervision of the Crown Agents for the Colonies to the requirements of Mr. C. D. Lambert, Chief Mechanical Engineer.

The locomotives are standard gauge six coupled axles machines with 6-ft. diameter coupled wheels. The cylinders are 21-in. in diameter, with a stroke of 28-in. and the working pressure is 180 lbs. per square inch. At 90 per cent boiler pressure the tractive effort works out at 27,783 lbs., the factor of adhesion being 4-48. The valves, supplied through outside steam pipes, are of the piston type, 10-in. in diameter, driven by Walschaert gear, the maximum travel being 6 3/32-in. The valves have the following characteristics: 1½-in. steam lap; ⅛-in. lead; and no exhaust lap. Hendrie bye-pass valves are provided on the cylinders. The 6-ft. coupled wheels extend over a wheelbase of 13-ft. 11 31/32-in. The bogie, which has wheels 3-ft. 7-in. in diameter, has a wheelbase of 7-ft. The total wheelbase of the engine is 27-ft. 5 31/32-in. The weight on the coupled wheels in working order is 55 tons 11 cwts., and total weight of the engine under similar conditions 76 tons 17 cwts.

The boiler barrel is telescopic, of 5-ft. 6-in. outside diameter at the largest ring. The length between tube plates is 14-ft. The firebox and shell have a sloping back head, the throat sheet and bottom part of the firebox tube plate also sloping forward. The firebox is of the Belpaire type, 9-ft. 8 1/16-in. long at the top. The grate, between the frames, is sloping and 9-ft. 6 3/16-in. long, and with a width of 3-ft. 4⅜-in. provides an area of 32 sq. ft.

The evaporative heating surface is made up of 990 sq. ft. provided by 136 tubes 2-in. in outside diameter, and 24 5¼-in. tubes accommodating superheater elements and furnishing 463-7 sq. ft.; the firebox, of copper, provides 192-6 sq. ft. making a total of 1,646.3 sq. ft. The 24 superheater elements provide 330 sq. ft. of surface. The superheater is of the Superheater Company's pattern, with anti-vacuum valve. The equipment includes Clyde soot-blowers, a Worthington-Simpson 2 B vertical feed-water heater and pump, and a No. 10 Gresham under-footplate type injector. There are two 3-in. Ross safety valves. The grate is of the rocking type.

The bogie has 7½-in. total side play, the movement being under the control of three joint suspension hangers. Braking is applied to the coupled wheels, the rigging being equalized. It is operated by two Westinghouse cylinders inside the frames and in front of the leading coupled axle. The Westinghouse brake is also fitted to the tender, which also is supplied with the usual hand gear. Lubrication for the cylinders is supplied by a four-feed Detroit sight feed lubricator, while a 10-feed Wakefield mechanical lubricator supplies the axle boxes of the coupled wheels and bogie. The sanding apparatus is of the Lambert wet sanding type. The engine is supplied with a Teloc speed indicator.

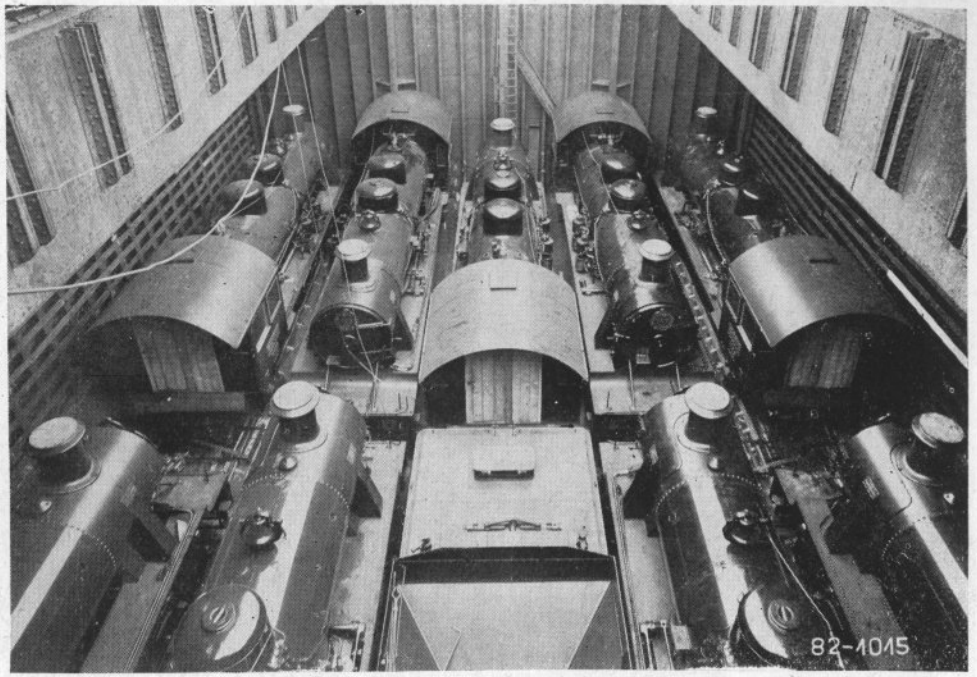
The tender has two bogies with wheels 3-ft. 7-in. in diameter. It has a capacity of 6,000 gallons of water and bunker space for five tons of coal. The bogie wheelbases are 6-ft., the total wheelbase being 17-ft. 9-in., and over all length 25-ft. 0⅜-in.

The locomotive is furnished with Majex couplers. The overall length of the engine and tender is 63-ft. 3¼-in. over buffer beams, and the total weight in working order 138 tons 14 cwt.

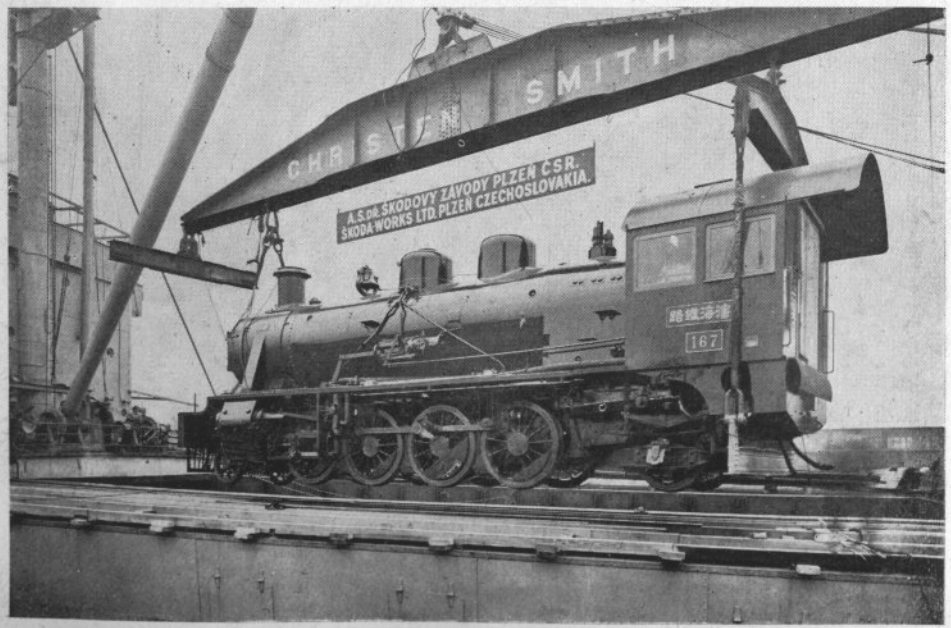
Other special equipment and fittings include the Worthington-Simpson "ZB" vertical type feed water heater and boiler feed pump and a No. 10 Gresham's patent underfoot plate type injector. The Westinghouse air system is employed for the brakes to all coupled wheels and the tender wheels, the latter are also fitted with a hand screw brake. "Stones" electric lighting, "Teloc" speed

SHIPMENT OF 25 SKODA LOCOMOTITES FOR THE MUKDEN-HAILUNG RAILWAY

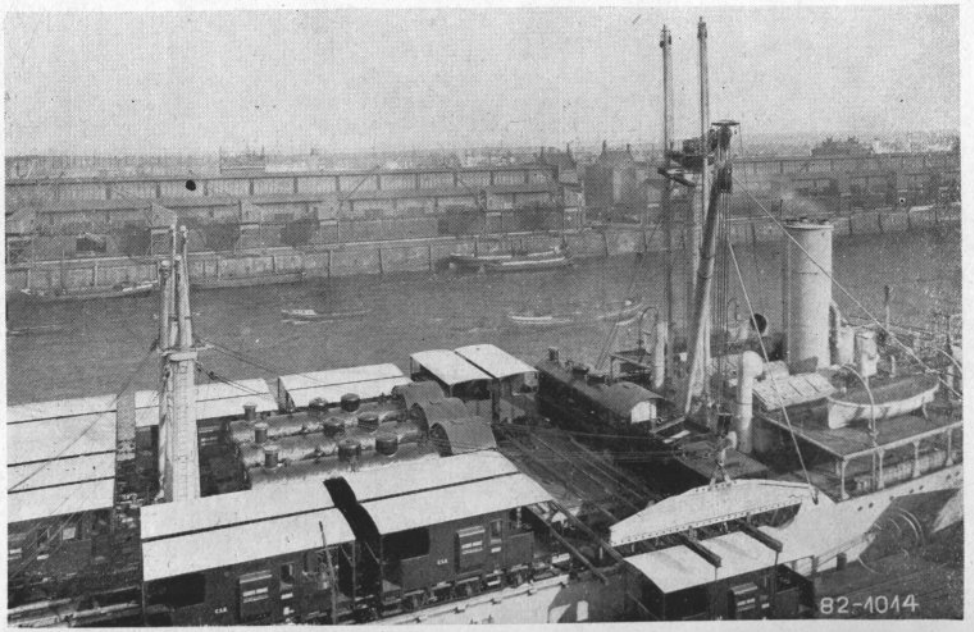
Completed order of 24 Locomotives, outside the shops of the Skoda Works in Prague, awaiting shipment



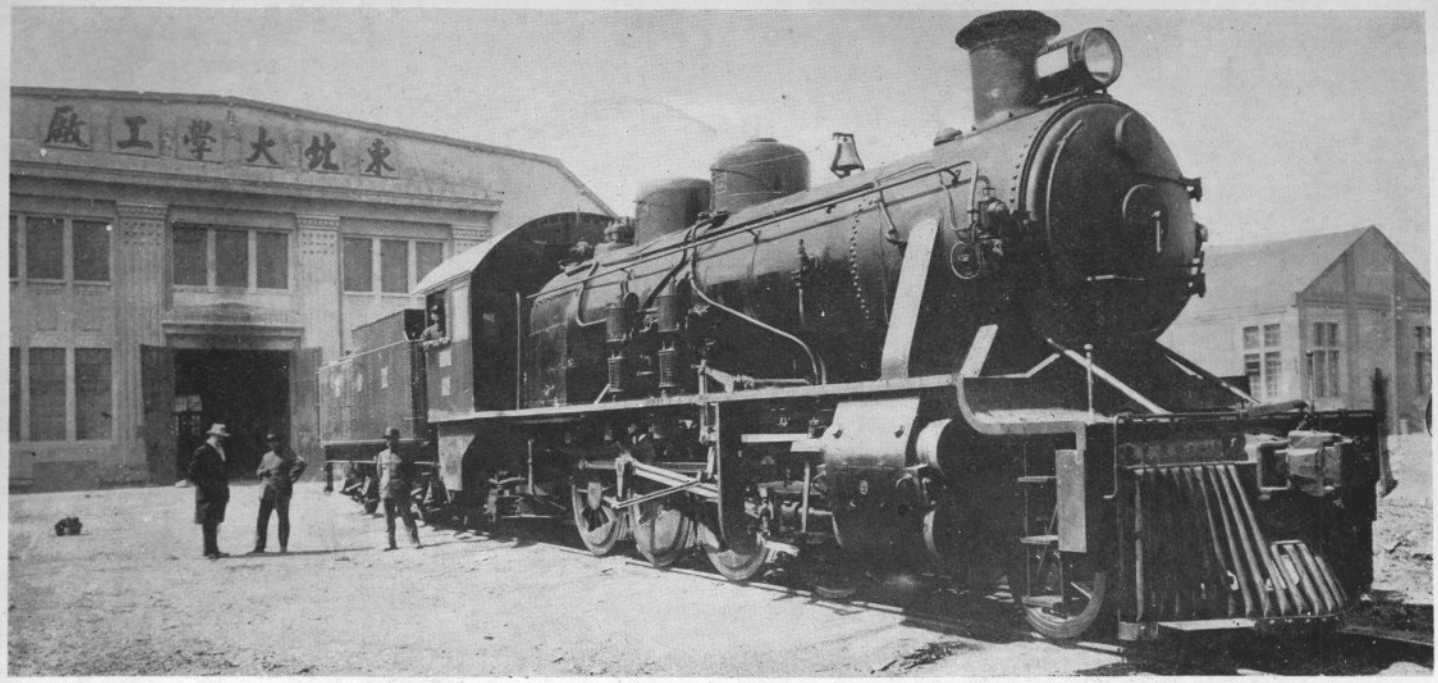
Showing Locomotives Stowed in Hold of Steamer



Lowering Complete Locomotive in Hold of Steamer at the Port of Hamburg



Deckload of Locomotives and Tenders

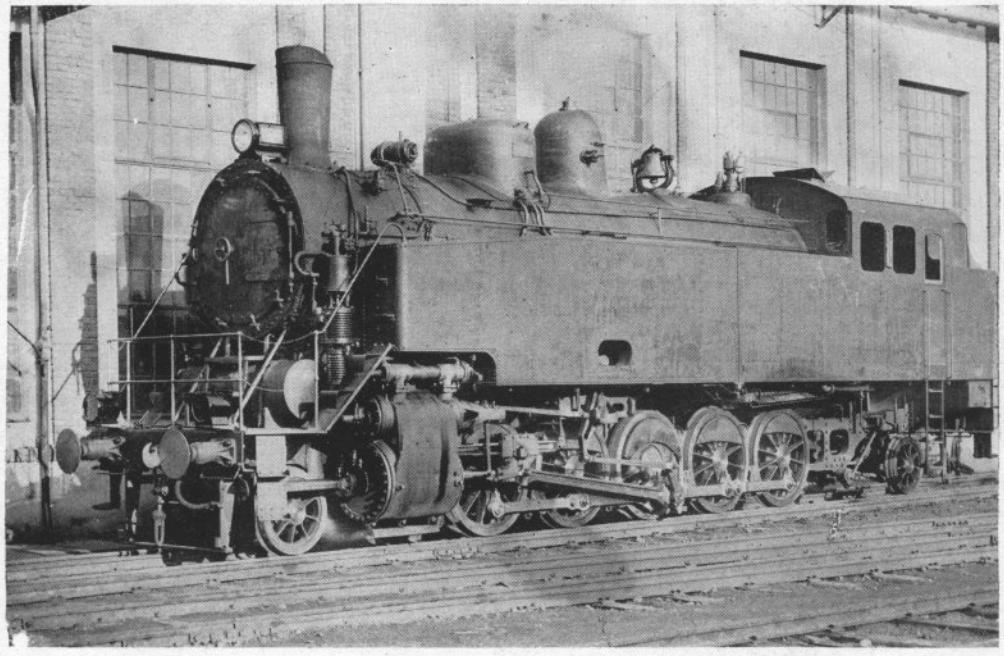


24 of these Mikado Type Locomotives for the Mukden-Hailung Railway were Supplied by the Skoda Works of Prague

indicator, "Franklin" air operated firedoor, "Ross" pop safety valves, "Hendrie" bye-pass valves, to the cylinders, "Majex" central couplers, Superheater Company's apparatus with anti-vacuum valves, and "Clyde" soot blowers. Two of the engines were fitted with "JOCO" type regulator while the third was fitted with the "Younghusband" type. The connecting and coupling rods are of "Vibrae" steel.

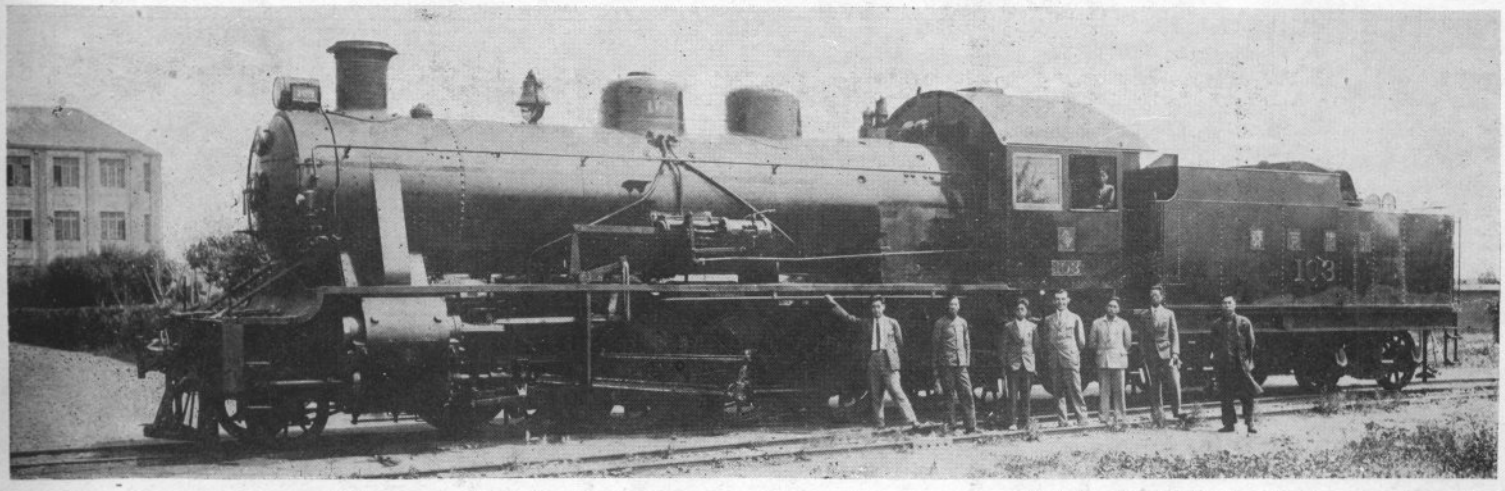
NEW 4-6-2 TYPE LOCOMOTIVES FOR THE NANKING-SHANGHAI RAILWAY

These engines are equipped with mechanical stoking apparatus and are introduced for fast passenger service, and, in addition, for heavy goods service at low speeds.

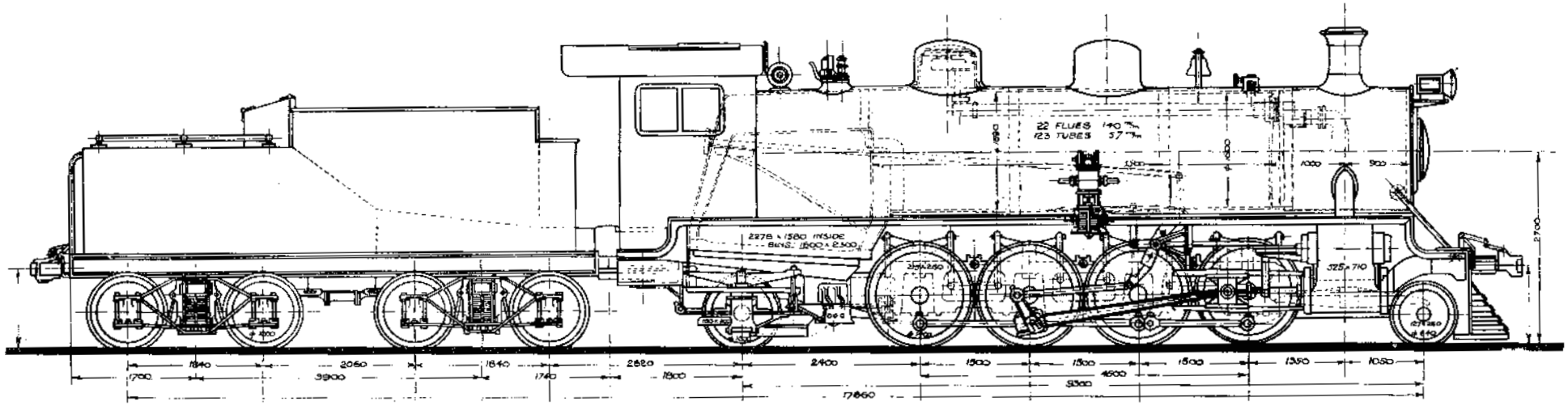


Heavy Tank Locomotive, 2-10-2 supplied by the Skoda Works, Ltd. to the Chinese Eastern Railway

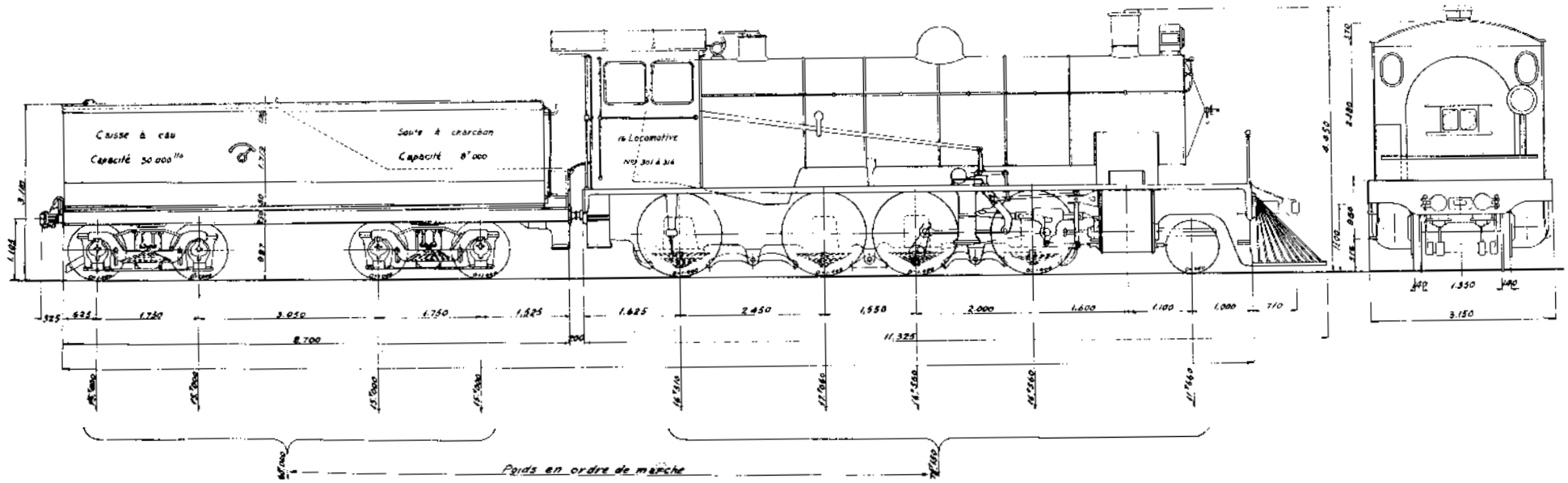
Eight 4–6–2 type locomotives equipped with double bogie tender carrying mechanical stoking mechanism have recently been completed to the order of the British and Chinese Corporation for the Nanking-Shanghai Railway by the North British Locomotive Co., Ltd, Glasgow. The engines, which have been designed and constructed in accordance with the



24 of these 2-8-2, Two cylinder, superheated Standard guage Locomotives were supplied to the Tsitsihar-Koshan Railway by the Skoda Works of Prague. Steam pressure, 185 lbs. Total heating surface, 2059 sq. ft.: Total weight in working order 75 Tons: Weight of Tender in working order, 51.25 Tons: Maximum speed 43.5 m.p.h.

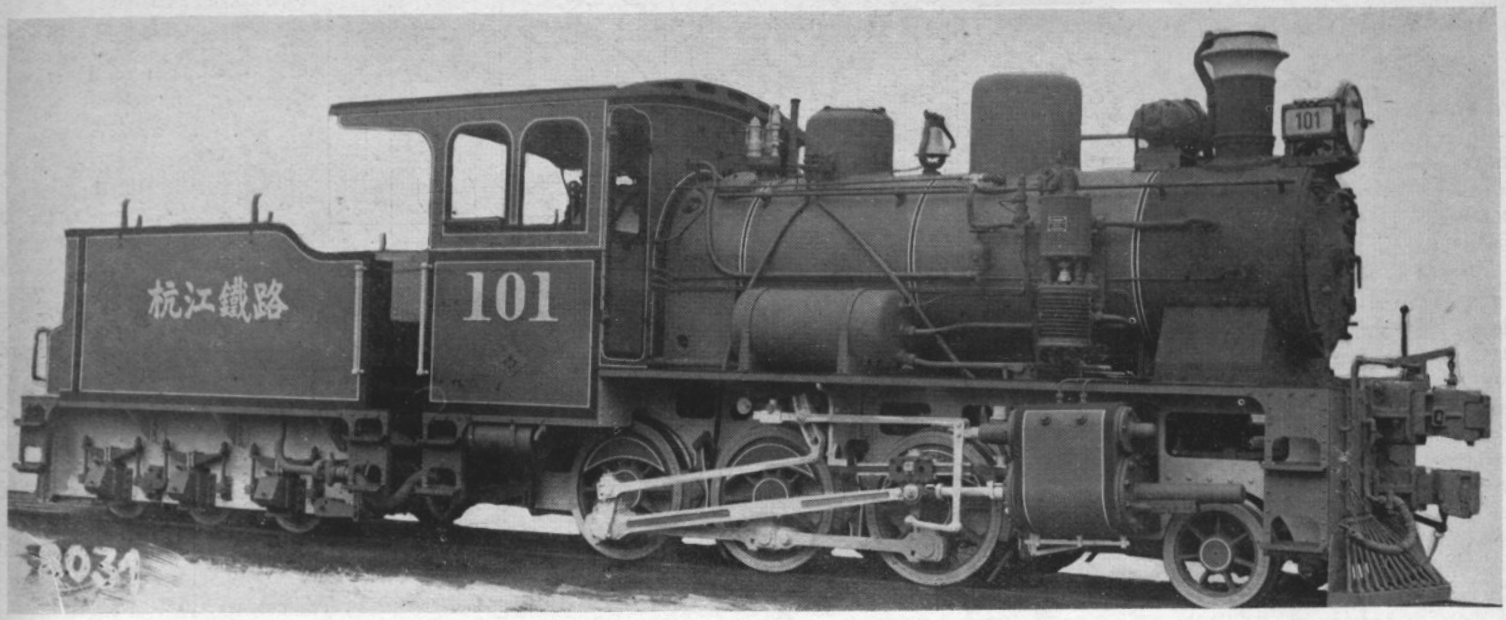


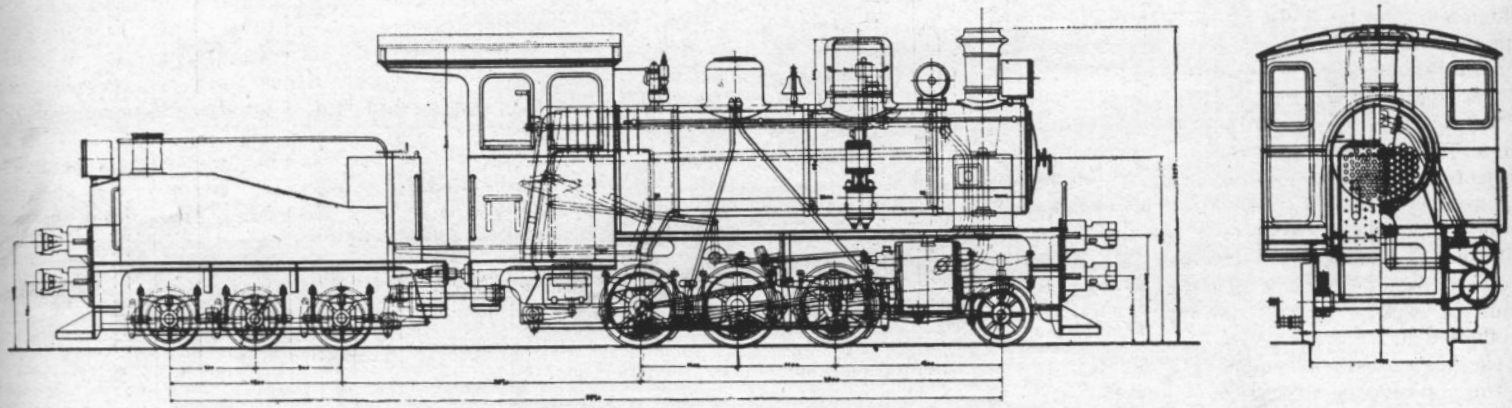
Mikado, 2-8-2, two Cylinder Locomotive supplied by the Skoda Works, Ltd. to Chinese Government Railways in Manchuria



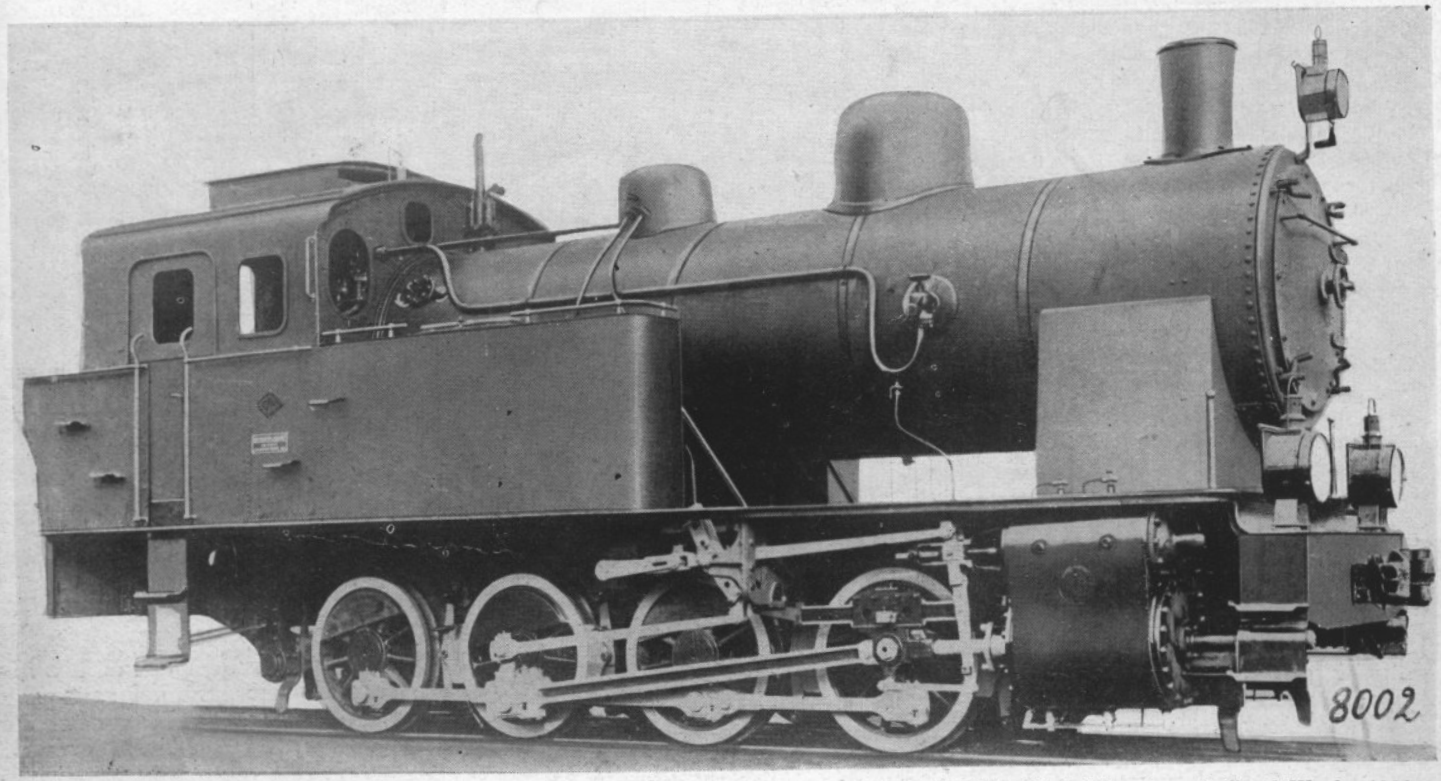
2-8-0 Consolidation Type Belgian Locomotive for the Lung-Hai Railway, Makers, Les Ateliers Metallurgiques de Tubize

RECENT GERMAN LOCOMOTIVES FOR CHINESE RAILWAYS



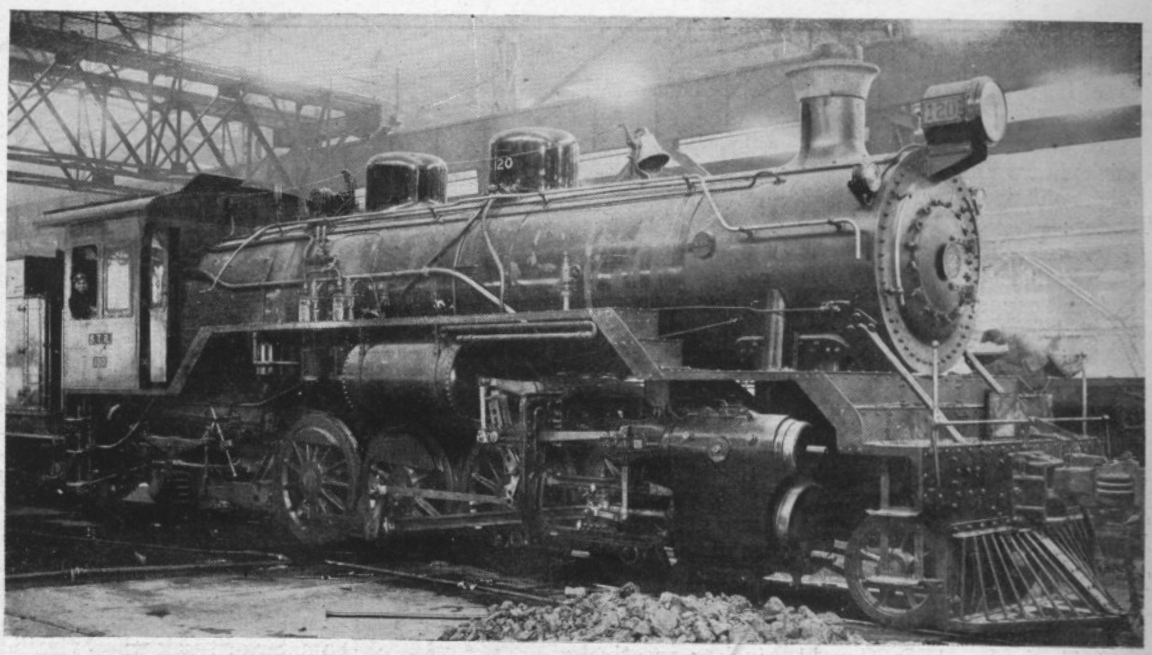


One of Nine Standard Guage Mogul Type Locomotives ordered by the Hangchow-Kiangshan Railway from Orenstein & Koppel, A.G. Berlin



Orenstein & Koppel Standard Gauge, 8-wheeled Tank Locomotive supplied to the Han Yeh Ping Iron & Steel Works 1930

specifications of Messrs. A. J. Barry, C.B.E., K. A. Wolfe Barry, O.B.E., and L. Lumsden Rae, the consulting engineers to the Nanking-Shanghai Railway, and to their inspection, are being introduced for working fast passenger trains and, in addition, heavy freight trains at low speeds, thus ranking them as mixed-traffic locomotives with distinctive characteristics.



Mikado Type 2-8-2 Belgian Locomotive (Baume-Marpent, Liege) Supplied to the Ssupingkai-Taonan Railway by Arnhold & Co., Ltd.

These engines have two single-expansion cylinders placed outside the frames and driving the middle pair of coupled wheels. The piston valve steam chests are placed above them, the valves being actuated by Walschaerts gear. The boiler is fitted with a wide firebox and has the ample grate area of 50.3 sq. ft. The equipment of the locomotive, of which details are given later, is of a complete description, the most noteworthy feature being the mechanical stoking device, which is of the Du Pont Simplex underside feeder type. Details of this are shown in one of the accompanying drawings, and the general layout of the mechanism is also seen in the sectional drawing of the tender as a whole.

Coal from the bunker falls into the stoker conveyor on the tender, a crusher plate lying under the coal gap. The conveyor projector and screws extend forward to the underside of the firebox and to a vertical projector, from which the coal is delivered in the firebox just below the level of the fire door, from whence it is distributed by steam jets over the grate. Surrounding the vertical projector is a protection grating, which also allows an air current from the ashpan to pass upwards. Control of the amount of coal is effected in two ways, first by the sliding plates over the gap and at the bottom of the bunker, and secondly, by regulating the speed of the conveyor screw which is actuated by a steam engine. This latter is of the two-cylinder horizontal type, its speed being controlled by the throttle valve.

The driving shaft and the internal conveyor screw are fitted with universal couplings and the conveyor housing is fitted with ball joints to allow of the necessary flexibility between the engine and tender. The conveyor housing between the ball joints forms a heavy coupling, which allows for the detachment of the tender from the engine. It may further be noted that when detached the stoker may be used to unload the coal on the tender, it only being necessary for this purpose that a steam or air pressure connection should be available.

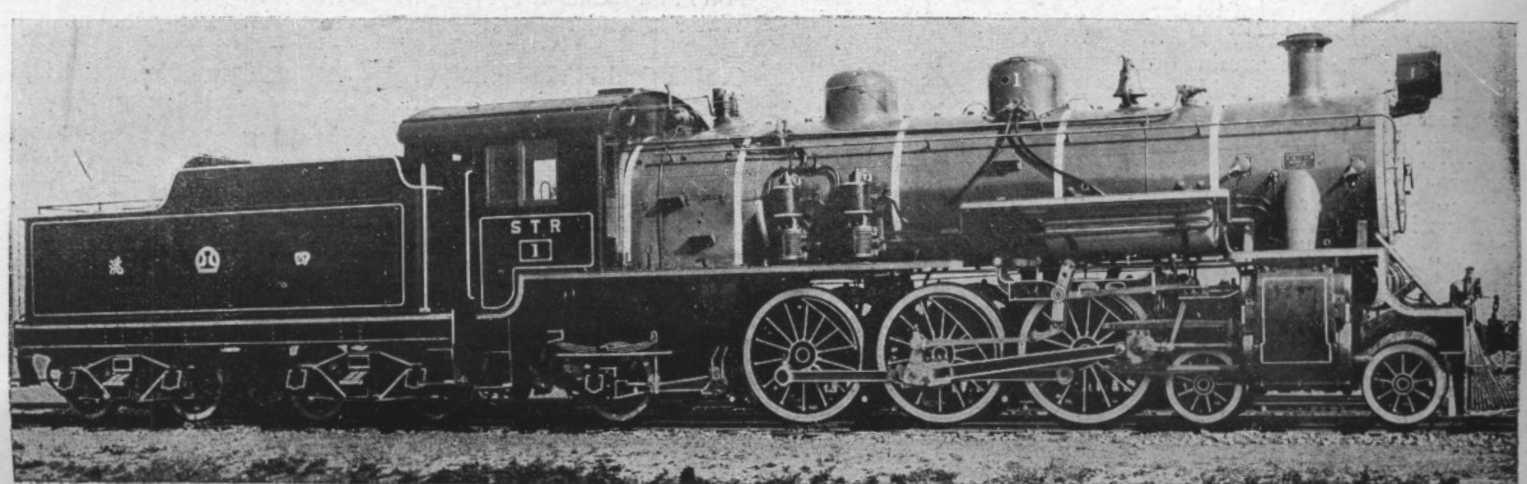
The equipment of the engine includes the following fittings :—Boiler top feed—Holden & Brookes injector—Weir pump and feed heater—Detroit sight feed lubricator—Ross Pop safety valves—superheater with multiple valve regulator and a set of 22 elements manufactured by the Superheater Co., Ltd.—The Westinghouse Brake & Saxby Signal Company's carriage heating valves, etc.—Lambert sanding valves—Westinghouse automatic and non-automatic brake—electric head-light and cab lighting (Stone's system).

The arrangement of the cab interior and fittings is clearly shown in the photographic illustration reproduced below—and we also give an illustration of the front of the tender showing the location of the conveyor screw.

DETAILS OF MECHANICAL STOKER WITH ENGINE AND TENDER CONNECTIONS

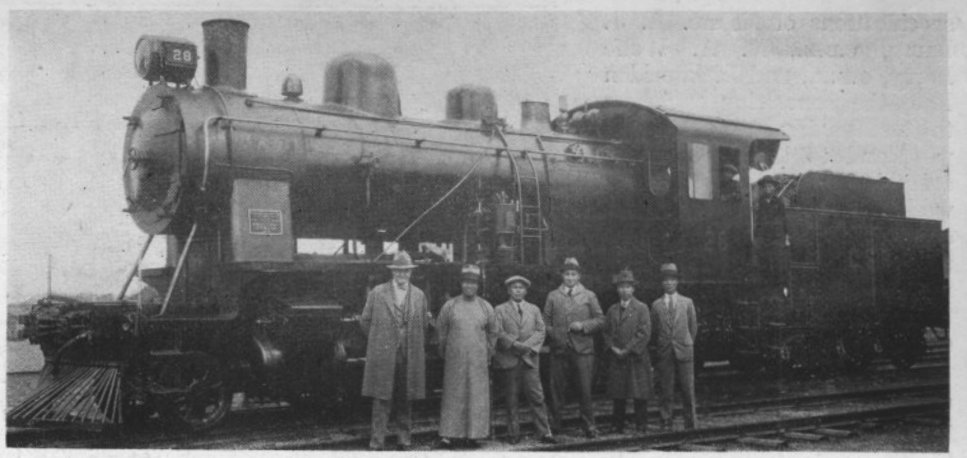
The main particulars of the locomotive are as follows :—

Cylinders, diam.	20½-in.
,, stroke	26-in.
Wheels, front bogie, diam.	3-ft. 0-in.
,, coupled, diam.	5-ft. 3-in.
,, hind radial, daim.	3-ft. 6-in.
Wheelbase, rigid	11-ft. 6-in.
,, total	33-ft. 9-in.
Working pressure	200 lbs. per sq. in.
Boiler heating surface tubes	1,424 sq. ft.
Brick arch tubes	24 ,, ,,
Fire-box	210 ,, ,,
Total	1,658 sq. ft.
Superheater	400 ,, ,,
Combined total ..	2,058 sq. ft.



One of Four Pacific Type Locomotives for the Chinese Government Ssupingkai—Taonan Railway Built at S.M.R. Workshops at Dairen

Grate area	50.3 sq. ft.
Tractive force at 75 per cent of boiler pressure	26,000 lbs.
Tractive force at 85 per cent of boiler pressure ..	29,480 lbs.
Weight in working order ..	90 tons 16 cwt.
Weight on coupled wheels ..	54 tons.
Tender :—	
Wheels, diam.	3-ft. 6-in.
Wheelbase	20-ft. 6-in.
Tank capacity, ...	6,000 gallons.
Fuel space (12 tons) ..	540 cub. ft.
Weight, full	71 tons.
Wheelbase, total engine and tender	63-ft.



One of two 2-8-0 Schwartzkoff locomotives Supplied to the Canton-Samshui Railway

The Nanking-Shanghai Railway is laid on the 4-ft. 8½-in. gauge, with 85 lbs. per yard flat-bottomed rails and operates over a mileage of 200. The alignment is easy, the maximum curve being 20 chains, and the maximum gradient 1 in 180 for a short distance. The locomotives are capable of traversing in the sidings 1 in 6 crossings with 12-ft. points.

The Engineer-in-Chief and the Locomotive Superintendent are Mr. I. Tuxford and Mr. Geo. T. Finch, respectively.

Belgian Locomotives for China

On page 13 will be found a drawing of the Consolidated 2-8-0 Belgian locomotives for the Lung-Hai and Shanghai-Nanking lines. Sixteen locomotives of this type were delivered to the Lung-Hai line in 1924 through the Societe Belge de Chemins de Fer en Chine. Since then as noted above, six additional engines of this type were supplied to the Lung-Hai line in 1929, and eight to the Nanking-Shanghai line. All of these locomotives were built at Les Ateliers Metallurgique de Tubize in Belgium and the last fourteen delivered in 1929, 30 were paid for by the remitted Belgian Boxer Indemnity funds. The specifications for these engines follows :

Locomotives Consolidation Simple Expansion—Specifications

Grate	length	2.400	m.	
	width	1.500	,,	
	surface	3.60	m^2	
Heating surface	furnace	13.20	,,	
	tubes	166.80	,,	
	total	180.00	,,	
Tubes	quantity small	218		
	quantity large	24		
	diameter small	40/45	m/m	
	diameter large	118/127	,,	
Outside heating surface		45.00	m^2	
Capacity of boiler	water	6.600	m^3	
	steam	3.400	,,	
	Total	10.000	,,	
Diameter of cylinders MP.		0.600	m.	
Course of pistons		0.660	,,	
Diameter of wheels	motrice	1.400	,,	
	supporting	0.900	,,	
	of tender	1.000	,,	
Weight of Loco. empty		70.350	T.	
,, ,, ,, in running order		78.150	,,	
Adhesing weight of machine		66.480	,,	
Effort of traction		12.550	,,	
Power in hp.		1.300	hp.	
Weight of tender empty		22.000	T.	
,, ,, ,, loaded		60.000	,,	
Capacity of water tanks		30.000	,,	
,, in coal		8.000	,,	

Belgian Locomotives for Manchuria

In addition to the locomotives supplied to the Lung-Hai and Nanking-Shanghai lines, four Mikado type engines built by Liege have been supplied to the Chinese Government Ssupingkai-Taonan Railway in Manchuria by Messrs. Arnhold & Company. The specifications of these engines follows :

Gauge of track	1435 m/m (4′ 8½″)
Service	freight
Diameter of cylinder	520 m/m.
Piston stroke	710 ,,
Diameter of driving wheel	1400 ,,
Diameter of truck wheel (leading)	840 ,,
Diameter of truck wheel (trailing)	1000 ,,
Inside diameter of boiler at smallest course	1600 ,,
Steam pressure	13 kg./sq. c.m.
Length of fire box at grate surface	2278 m/m.
Width of fire box at grate surface	1580 ,,
Number of tubes	123.
Diameter of tubes	57 ,,
Number of flues	22.
Diameter of flues	140 ,,
Length of tubes and flues	5500 ,,
Number of arch tubes	4.
Diameter of arch tubes	76 ,,
Driving wheel base	4500 ,,
Engine wheel base	9300 ,,
Engine and tender wheel bases	17660 ,,
Width of engine	3150 ,,
Height of boiler center line above rail	2700 ,,
Approx. weight in working order :—	
Leading wheels	7000 kg.
Driving wheels	62400 ,,
Trailing wheels	13600 ,,
Engine	83000 ,,
Tender	52500 ,,
Weight empty (engine)	73000 ,,
Weight empty (tender)	21000 ,,
Kind of fuel	soft coal.
Heating surface :—	
Tubes and flues	172 sq. n.
Fire box	17 ,,
Arch tube	1.7 ,,
Total	190.7 ,,
Super heating surface	44 ,,
Grate area	3.6 ,,
Grate	1 in 130
Minimum radius of curve	500 m.
Water in tender	22½ cub. m. (5950 USG.)
Coal in tender	9 tons (metric)
Tractive force	14900 kg.
Factor of adhesion	4.06

German Locomotives for China

The most recent orders from China placed in Germany for locomotives, have gone to Orenstein & Koppel, A.G. of Berlin, who have a long record of sales in the Far East having supplied to date over one thousand engines for various railways from Japan to Java. The latest order is for nine Mogul type engines for the Hangchow-Kiangshan Railway in Chekiang, a private Chinese enterprise. The O. & K. engines ordered are of special interest for new railways in this country, having a service weight of 37 tons for standard gauge track of very light rails, which in this instance are 35 lbs. The locomotive develops 160-180 h.p. and a speed of 40 km. per hour. It is equipped with Westinghouse air brakes,

electric lighting and arched brick fire-box. The following are the main dimensions of the engine :

Tender

Diameter of wheels	600 m/m.
Wheel base	1800 ,,
Water capacity	5000 L
Fuel capacity	2500 ,,
Weight empty	CA 7, 0 T
Weight in working order	CA 14, 0 T

Locomotive

Gauge of track	1435 m/m.
D ameter of cylinders	310 ,,
Stroke of pistons	450 ,,
Diameter of driving wheels	900 ,,
Diameter of bogie wheels	600 ,,
Wheel base rigid	2200 ,,
Total	3900 ,,
Working pressure	12 atm
Heating surface total	43, 7 m^2
Grate area	0.9 ,,
Weight empty	CA 20, 2T
Weight in working order	22, 0 ,,
Weight in working order, driving ...	19, 0 ,,
Tractive power (0.6)	3460 kg.

Messrs. Orenstein & Koppel also supplied last year an eight-wheeled tank engine for the Han Yeh Ping Iron & Steel Works for service in their mines.

In addition to the above, the Canton branch of Messrs. Reuter, Brockelman & Company, supplied in 1929, two Schwartzkopf 2-8-0 locomotives for the Canton-Shamsui Railway, one 2-6-2 Henschel locomotive for the Swatow-Chaochowfu Railway, and two locomotive boilers for the Canton-Kowloon line.

We are informed by the management of the Far Eastern Agencies of the (Ceskomoravska-Kolben-Danek) C.K.D. Works of Prague, Czechoslvakia, that three of their 2-8-2 locomotives have been supplied to railways in North China during the past two years. The illustration on page 18 shows these locomotives which are fitted with Lentz valve gear.

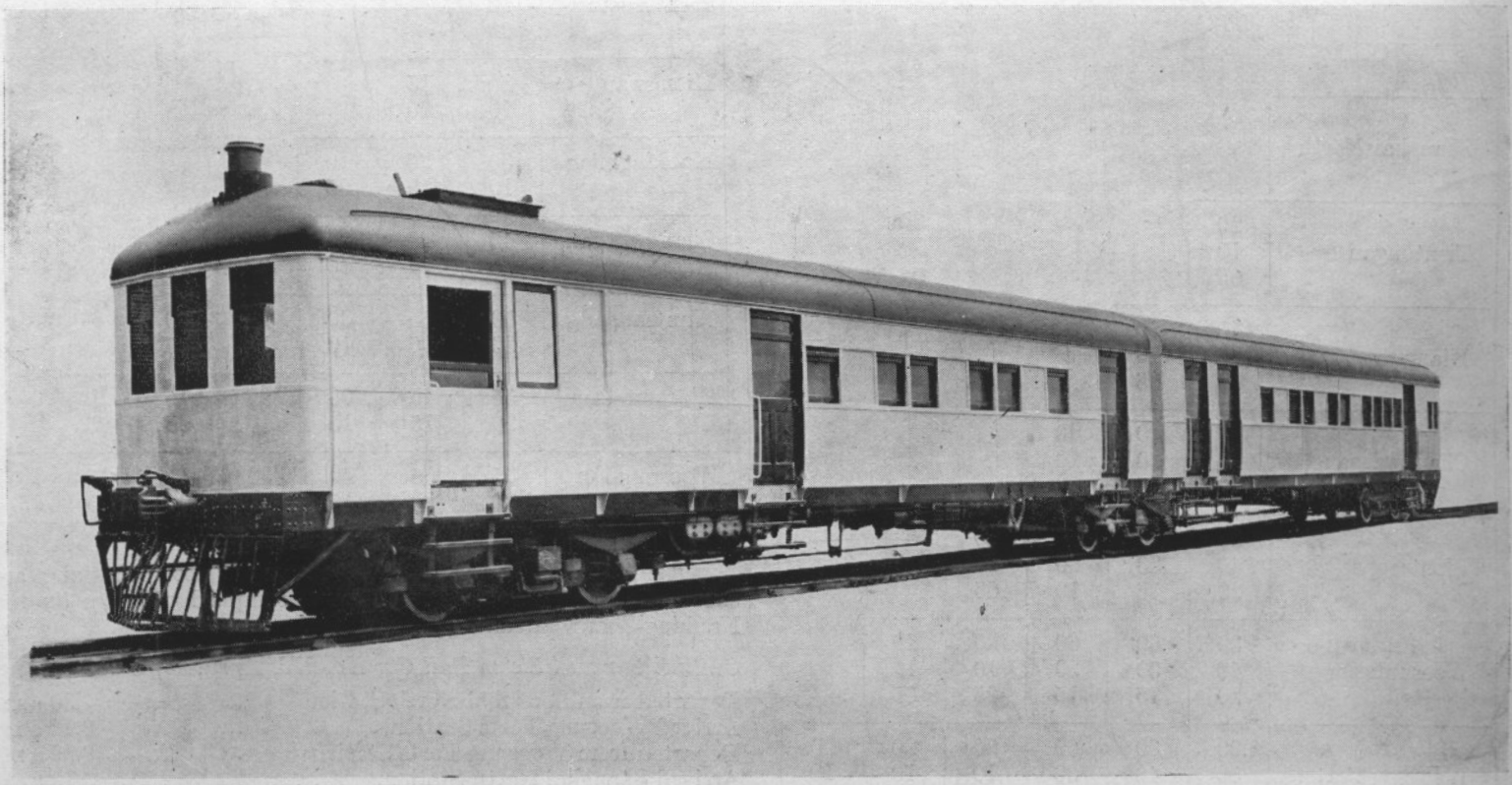
Sentinel-Cammel Steam Rail Cars

For the Nanking-Shanghai Railway

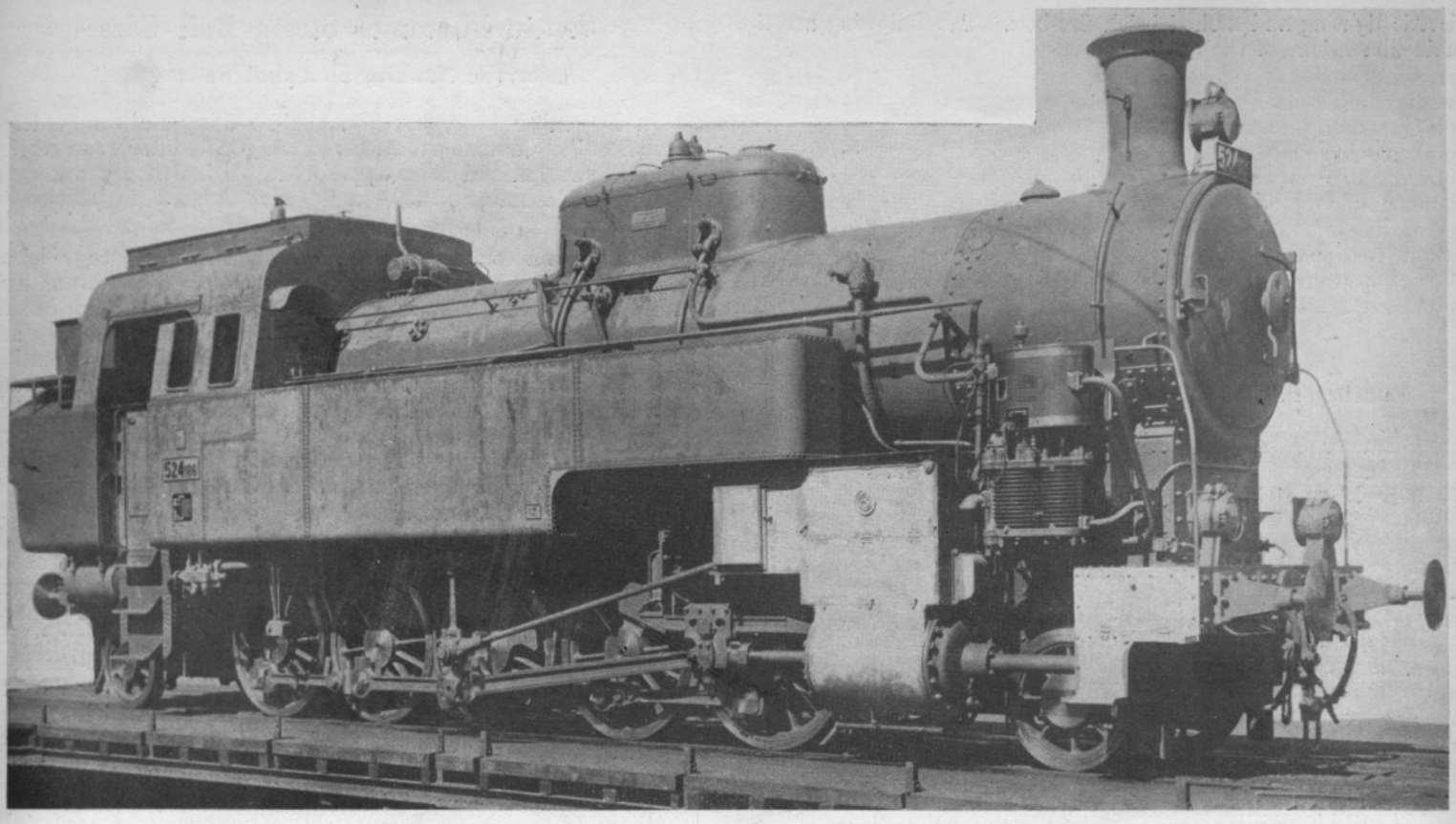
In December 1928, the Shanghai-Nanking Railway ordered twelve Sentinel-Cammel Steam Rail Cars, for its interurban service between Shanghai and Woosung Forts. Their delivery was completed in November 1929, and were placed in service in March 1930.

These steam cars represent one of the most modern, efficient and economical means of carrying passengers on railways. The manufactureres claim that no other type or make of railcar can be operated at such a low cost, and point to the fact that they are now running in 44 different countries. Asiatic railways operating these cars include those in Borneo, Ceylon, China, India, Iraq, Korea and the Malay States. These cars are steam driven using the coal of the country as fuel and have no complicated machinery which require special training or knowledge to handle. Those of the latest type running on six pairs of wheels and fitted with twin bodies carry 150 passengers. The total weight of the car complete with passengers, luggage, engine, boiler, water tanks and coal is only 57 tons, and consumes only 17 lbs of coal per mile, and about 1/20 of one pint of lubricating oil per mile. The engines of the car are of 107 h.p. They are fitted with Westinghouse air brakes, electric light and steam heating. The saving of money which resulted from the purchase of these five sets of Sentinel-Cammell steam railcars and the benefits which the railway was enabled to offer to its passengers by the reduction of fares is well illustrated by the following official figures compiled by the Railway Authorities.

	Number of passengers carried	*Amount collected in fares*
April 1929, with trains drawn by ordinary steam locomotives and with fares charged at ordinary rates as per Table "A"	105,554	$15,835.35
April 1930, with Sentinel - Cammell steam railcars and with reduced fares charged as per Table "B"	209,474	$30,715.6



Sentinel-Cammel Steam Rail Cars in Operation on the Shanghai-Nanking Railway



2-8-2 C.K.D. Works Locomotive supplied to railways in China

The railway therefore carried one hundred and three thousand nine hundred and twenty-one more passengers in the Sentinel-Cammel steam railcars in the one month and earned fourteen thousand eight hundred and eighty dollars.

Nanking-Shanghai Railway

Passengers Fares—Table of rates charged *before the Sentinel-Cammell steam rail cars were put into service* on the Shanghai-Woosung Line.

TABLE "A."

STATIONS.						
Shanghai North						
Tientungan	20 10 05					
Kiangwan	40 20 10	20 10 05				
Changwarpang	80 40 20	60 30 15	40 20 10			
Wantsaopang	80 40 20	60 30 15	40 20 10	20 10 05		
Woosuntseng	80 40 20	60 30 15	60 30 15	20 10 05	20 10 05	
Woosung Forts.	1.00 50 25	80 40 20	60 30 15	20 10 05	20 10 05	20 10 05

Passengers Fares—Table of rates charged *as soon as the Sentinel-Cammel steam rail cars were put into service* on the Shanghai-Woosung Line.

TABLE "B."

STATIONS							
Shanghai North							
Tientungan	10 05						
Kiangwan	25 10	15 05					
Kaokingmiao	30 10	25 10	10 05				
Changwarpang	45 15	40 15	25 10	15 05			
Wantsaopang	50 20	45 15	30 10	20 10	10 05		
Woosungtseng	55 20	45 15	35 15	25 10	15 05	10 05	
Woosung Furts	55 20	55 20	40 15	30 10	15 05	15 05	10 05

The manufacturers claims for economy in cost of running are substantiated by the following figures compiled officially by the Nanking-Shanghai railway authorities.

Sentinel-Cammell Steam Rail Car No. 275, April, 15, 1930.

Departed from Shanghai North Station	7.30 a.m.
Arrived Woosung Forts Station,.	8.12 a.m.
Departed from Woosung Forts Station	8.29 a.m.
Arrived Shanghai North Station, ...	9.10 a.m.
Departed from Shanghai North Station	9.24 a.m.

Arrived Woosung Forts Station . ... 10.03 a.m.
Departed from Woosung Forts Station ... ... 10.13 a.m.
Arrived Shanghai North Station. ... ... 10.50 a.m.
Twenty-eight stops at Stations for two return trips 80½ minutes
Total standing time at Stations for two return trips
Total coal consumed for two return trips 657 lbs ; — 298 kgs.
Total distance two return trips — 40 miles — 63.48 kms.
Standing time at Stations 80 ½ minutes=40 lbs. coal per hour — 53 lbs — 24.04 kgs.
Overall coal consumption 657 lbs — 40 — 1t 1bs per mile — 4.69 kgs. per km.
Actual coal consumption for running 604 lbs — 40 — 15 lbs.
Per mile — 4.32 kgs. per km.

North China Market for Railway Materials

U.S. Assistant Trade Commissioner Louis C. Venator, in a recent report to the Department of Commerce says that though the railways of North China made no purchases of rolling stock during 1930, dealers in railway materials report that business in general was fairly good—particularly in so far as the Peking-Mukden (Peiping-Liaoning) Railway is concerned. Imports of railway materials into Tientsin during 1930 were valued at 1,500,000 taels (about $388,450), as compared with approximately 500,000 taels ($196,150) during 1929. Although some of this business was closed during the latter part of 1929, the figure may be considered none too large to represent 1930 transactions, as reports from unofficial but well-informed sources indicate that purchases valued at more than 500,000 taels were made by the Peking-Mukden Railway during November and early December. This material, which includes metals for use in the railway shops at Tongshan, rods, small replacement parts, car furnishing, etc., will not arrive, of course, until 1931.

The condition of rolling stock on the Peking-Suiyuan Railway was extremely bad during the entire year. Both cars and locomotives were short in number, owing to the commandeering of military authorities, and those that remained in service were in need of repairs, but because of the lack of profitable operations throughout the year, no money was available either for purchases or repairs.

Purchases Additional Rolling Stock Planned

The Peking-Mukden Railway, on the contrary, was in better condition as regards rolling stock than at any time in the past few years, the cars and locomotives previously taken by military authorities into Manchuria and central China having been largely returned.

However, the equipment is still below requirements for operating schedules such as are planned for the near future and purchases are contemplated when and if money becomes available. At present, negotiations are under way for 20 locomotives and a considerable amount of shop and other equipment. The locomotives, it is understood, are to be purchased on a semi-credit or bank-guarantee basis, if manufacturers will agree. Purchases of other rolling stock are planned at a more remote date.

The Kailan Mining Administration, one of the largest customers of the Peking-Mukden Railway, closed the purchase of six locomotives from a British manufacturer during December. These locomotives are to be used mainly in operating Kailan trains, but will also be utilized in other ways.

The Peking-Mukden Railway would have had a favorable year and large revenues during 1930 had it not been for severe washouts which occurred at several points along the line during the late summer, and for the several weeks when traffic was entirely interrupted by the transportation of troops from Mukden to Tientsin. Operations during the other months of the year indicated a yearly revenue in the neighborhood of 30,000,000 Mexican dollars (about $8,538,000), but with these interruptions and the resulting loss in equipment and repairs it is probable that the total revenues will amount to less than three-quarters of this amount. Since a large portion of this amount must go to the Mukden Government, it is apparent that but a limited sum remains over and above operating expenses for the purchase of new equipment.

Prospects More Favorable for 1931

Prospects for railway business during 1931 appear promising. The managing director of the Peking-Mukden Railway is inaugurating a number of new principles intended to increase traffic in various ways and, with military traffic now reduced to a minimum, revenues of the railway will probably show a worthwhile increase as long as peaceful conditions obtain.

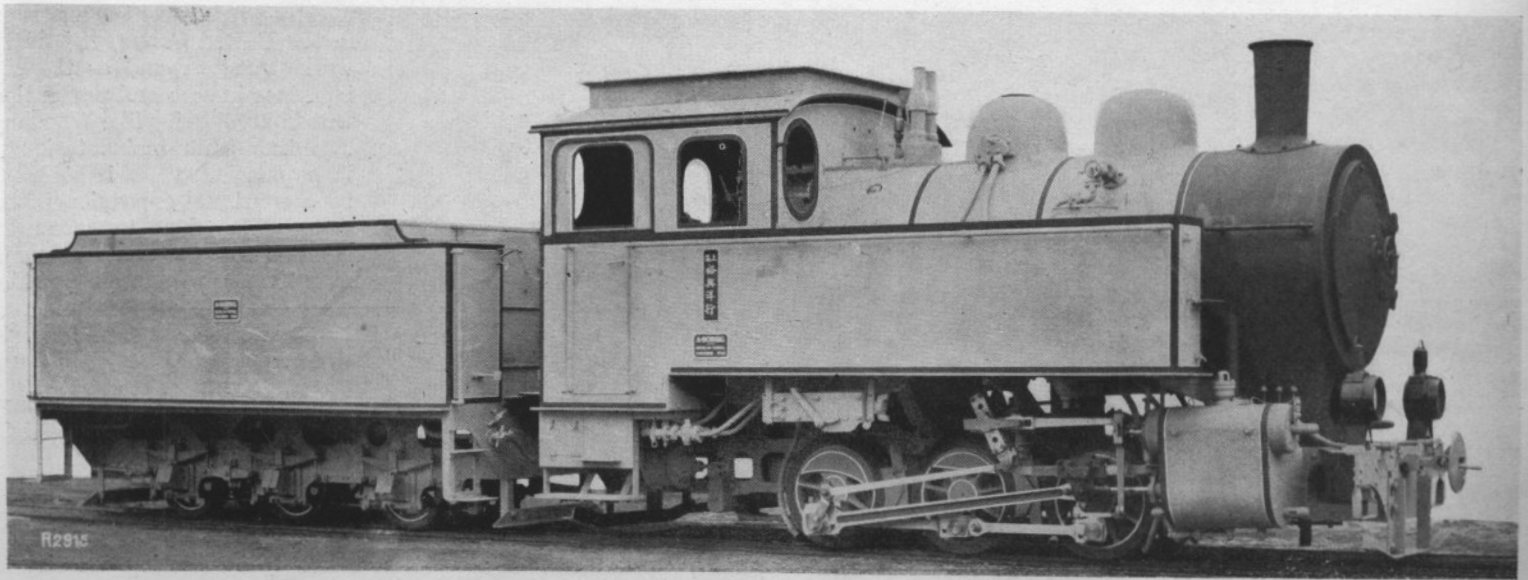
It also appears possible that the Mukden authorities will take over and operate the Peking-Suiyuan line. Some indications have appeared in the local press that the line will be operated as a portion of the Peking-Mukden Railway. Should this eventuate, considerable investment in the way of rolling stock and material will be made by the Peking-Suiyuan line as soon as operations with borrowed rolling stock from the Peking-Mukden Railway have returned a working capital,

Purchases for the Peking-Hankow and Tientsin-Pukow lines are being made almost entirely, with the exception of fairly small quantities of shop materials and supplies, from the southern terminals where the headquarters of each line are established. This situation will probably continue.

Opportunities for American Manufacturers

Representatives of American manufacturers who are closely in touch with the situation are likely to obtain a considerable share of the forthcoming business in most lines. Little opportunity exists for independent bidding by manufacturers, or for new trade connections at this time, however, as the parties already on the ground are well connected.

(Continued on page 176).

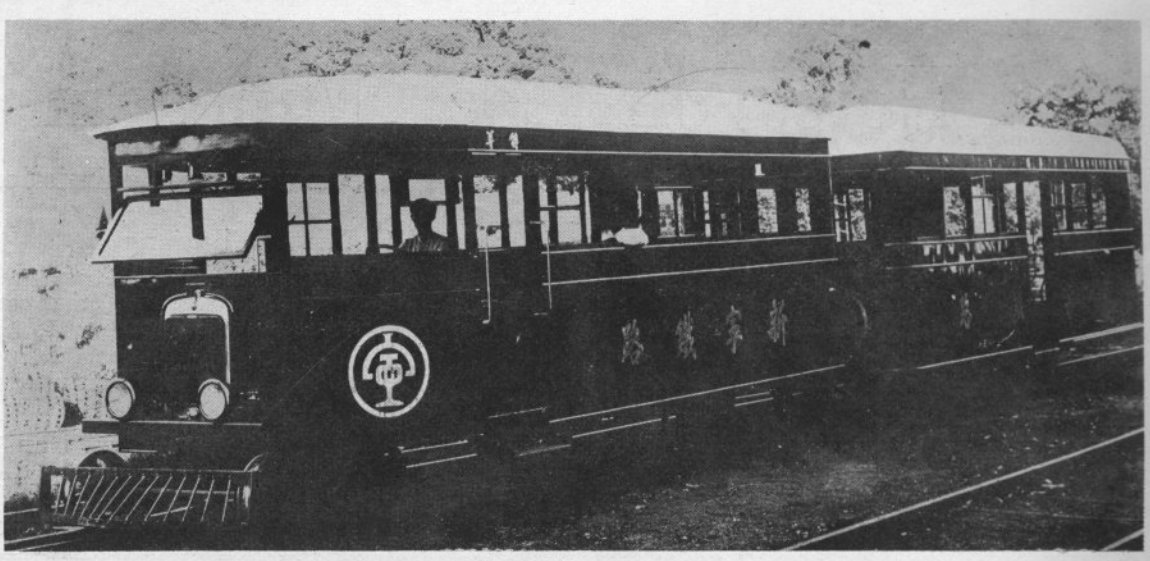


0-6-0 Borsig Locomotive for the Liu Chang Coal Mining Co.

MOTOR RAILWAYS IN SOUTH CHINA

Interesting Details of New Fleet Erected by China Motors on the Sunning Railway; Cheap, Modern Transport Methods

Rail Cars Run on Dodge Chassis



DEPARTURE IN RAILWAY TRANSPORT IN CHINA

On Feeder Lines to the Sunning Railway in South China, Engineers have Constructed Bodies on Dodge Chassis. These have been in Operation Since August and are Working very Satisfactorily

AFTER extensive study, Koppel engineers have developed the equipment necessary to convert Dodge Brothers chassis into railway motor cars of super strength and power for either standard or narrow gauge. The results in service prove that this equipment fulfills its purpose to the highest degree of satisfaction. Patents covering special forms of construction have been applied for.

In the accompanying illustrations the rail motor is seen as operated on the Sunning Railway, the conveyances being supplied by China Motors, of Shanghai, and they are the first of their kind in this country.

The total length of the Sunning Railway is 96 miles. The railcar with a trailer is being operated between the city of Toishan and the city of Pakshah, a distance of 32 miles. This railcar makes four return trips each day. The average number of passengers carried on railcar and trailer is 1,000 per day. The gasoline consumption is about 7.4 miles per one American gallon. As the Sunning Railway are using a " Y " shaped track instead of a turntable to turn the cars around, and as they do not have a reversing transmission, a good deal of gasoline is being wasted in switching. The consumption given includes this waste of gasoline. The correct consumption is 8-9 miles per gallon.

The other Dodge Brothers railcar which runs without the trailer is being operated between the cities of Toishan and Kungyick, a distance of 20 miles. This railcar does not run on a regular schedule, but it leaves from either terminal as soon as there are a sufficient number of passengers to make a trip. This railcar carries an average of 400 passengers per day. The gasoline consumption is about the same as the other railcar.

Advantages

Running a passenger car or truck on rails is much simpler than on the highway. There is no steering to do, no tyres to change, no traffic to consider. Corners, with their wear and tear on tyres and thrust members, do not exist, and there are no hills, at least as the chauffeur knows them.

The railway motor car is the lightest form of rolling stock now in use. Its weight per passenger is but a fraction of that for a steam train or an electric car. Because of this light weight, the upkeep of track is reduced to a very small item. On the other hand, it is possible to run these cars safely over a road-bed that would have to be abandoned if any other type of rolling stock were used. Their utility in a country like China, which calls loudly for transport facilities, can, therefore, be appreciated.

On railroads where passenger and freight traffic is small and bound to remain so for years to come, no matter what facilities for travel are offered, motor cars or trucks mounted on the specially designed flanged wheels and pony trucks can relieve steam trains of unprofitable trips.

To Any Dodge

The flanged wheel units are composed of a four-wheel swivel type truck for the front part of the chassis and two flanged drive wheels to replace the pneumatic rear wheels.

By the use of specially designed flanged drive wheels, they can be arranged for a maximum of 60 and a minimum of 50 inch track gauges. These units are designed in such a way they can be applied to the chassis by any Dodge dealer.

For track gauges less than 50 inches, it becomes necessary to rework the rear spring arrangement and replace the rear axle housing and drive shafts by correspondingly shorter ones, according to specified track gauge. Such work has to be performed by the builder of the rail car conversion units, and consequently the chassis has to be shipped to our factory for rebuilding and mounting of the flanged wheel equipment to chassis.

Cars Detailed

Following are brief specifications for the 42-in. track gauge car:

Front end equipment:—Pony Truck; Four wheel swivel type (wheels inside of truck frame), Wheelbase: 38 inches. Wheels: 18 inches dia., special ferro chrome iron with standard chilled tread and flange. Tread and flange to be ground smooth and true. Axles: Alloy steel. Bearings: Timken roller type fitted into bearing boxes. Bearing Boxes: Dust proof, self-aligning and provided with alemite oiling device. Pedestals: Malleable iron or cast steel. Center Plates: Malleable iron or steel. Side Bearings: Roller, anti-friction type. Truck Frame and Bolsters: All steel construction. Shock Absorbency Cushions: Rubber, enclosed in steel holders, to absorb the initial shock submitted from the wheels. Pilot: All steel construction, attached to frame of pony truck. Brake: Operated through the steering wheel and applied to all four wheels on pony truck. Brake Shoes: Removable type, cast iron. Brake Shoe Heads: Malleable iron. Pony Truck Application: The front springs of Dodge chassis are attached to truck body bolster with original clips furnished on chassis. Weight of pony Truck: 1,400 to 1,600 lbs.

New Railway Shop in Taiwan

Leveling of the ground has been started on the site for the new railway shops at Matsuyama, a suburb of Taihoku, Taiwan. This site of 1,850,328 square feet will be occupied by modern railway workshops and offices with a floor area of 341,595 square feet, which may, if the need should arise, be extended to 498,168 square feet. Plans call for the laying of approximately six miles of tracks in and leading to these shops. The buildings are scheduled to be completed within three years at a cost, including site and buildings, of approximately 3,120,000 yen (the yen is worth about $0.495).

ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW

上海黃浦灘念四號

遠東時報

BACK TO MOSCOW?
THE WINGS OF THE RISING SUN
CHINA'S RECONSTRUCTION
PROGRESS ON CHINESE NATIONAL RAILWAYS
GOVERNMENT RAILWAY EARNINGS
DAI - KOKU - GUN
PROGRESS IN AMOY
NEW JAPANESE MOTOR VESSELS

Vol. XXVII | APRIL, 1931 | No. 4

about ruined. China wants to buy American machinery, wheat, cotton, motor vehicles, rolling stock, chemicals and electrical supplies for her reconstruction work. China wants to trade with America; but trade is reciprocal. (Applause). Trade has no nationality. We need more market; you need more market. What is a market? A market is a place where you go to buy and you go to sell. If you only look for just a place to sell, then it is only half a market. We want to buy from you, but you must also buy from us. (Applause).

Another question of vital importance is the constant drop in the price of silver, until it has now reached the lowest level for all time, threatening the credit system of the world. The silver in an English shilling, with a face value of 25 cents, is now only worth 3¼ cents. Your American silver dollar is in consequence only worth a little over twelve cents. Gold standard countries suffer just as much as silver standard countries, if not more. It is principally because of the low price of silver that your surplus products cannot be directly distributed in Asia and indirectly in Europe and South America.

The world production of silver is about 250,000,000 ounces a year. Figuring at the market price to-day it is only about $70,000,000. If that were all, then the problem would be comparatively simple. But we must not forget the world's accumulated stock of billions of ounces of silver, which half of the world's population regards as its wealth, and in which they are now obliged to lose confidence. The United States Senate has wisely taken up the matter. Chinese bankers and industrial leaders have held many conferences, but the United States and China alone cannot solve this problem. It needs the immediate and serious attention of the statesmen of other nations, and their sincere co-operation. What is the matter with the League of Nations? What are the statesmen of to-day doing? Why not call a silver rehabilitation conference in the same manner as the Washington Disarmament Conference, or the World Conference.

Now, let us discuss international co-operation for the reconstruction of China by financial support. This, again, can be divided into two sections:

First, international private investments;
Second, governmental support.

Last year the American Foreign Power Company, headed by Sydney Z. Mitchell, bought the Shanghai Electric Plant and organized the Shanghai Power Company, the largest of its kind in China. Mr. Mitchell has shown remarkable leadership by his broadminded policy of co-operating with the Chinese, inviting Chinese capital to participate and Chinese business leaders to be represented on the Board. Such co-operation, I am sure, will bear fruit very quickly, as it meets the wishes of the Chinese people. It is clear that any reconstruction in China must be done from within and with the full co-operation of the Chinese people. It has been proven that foreign companies in China which pursued a conciliatory attitude towards the Chinese have succeeded better than the "die hards" who have not co-operated with the Chinese.

As regards government co-operation, it is my opinion that if the reconstruction of China can be regarded as one of the important ways out of the present world depression, then the problem can be easily understood. America's wealth in 1913 was one hundred ten billions; in 1929 it increased to three hundred twenty billions. The rest of the world owes you twenty-eight billions, including China's negligible amount of fifty millions, or one-fifth of one per cent. Your problem, it seems to me, is not whether or not you can collect these twenty-eight billions, but how to make your increased wealth of two hundred ten billions work, produce, and so keep up your prosperity. (Applause). The world has been greatly benefited by the development of America as an industrial and commercial nation; so a developed China, with her 460,000,000 population, will be another New World in the economic sense.

Nationalist China is ready to co-operate with the rest of the world. To prepare for such co-operation, the Minister of Railways, Sun Fo, the only son of the founder of the Republic, is busily consolidating the war-torn railroads and other transportation enterprises. It is needless to say that the immediate reconstruction of China would need public financing.

If the world wants quick development of China, then reconstruction credit should be arranged for the purpose of purchasing machinery, rolling stock and other material necessary for the rehabilitation work. If such credits are granted to China and China's economic progress is rapid, America and other nations that grant such credits will benefit equally with China, because they will create a larger market for their goods. Personally, for the permanent good of China, I would rather see a slow but steady development of our affairs, with the public financing done by the Chinese.

What does it matter if China's reconstruction should have to be extended twenty or even fifty years, so long as we are sure of it? A sure, slow progress is far better than a quick, radical one. Furthermore, public finance among the Chinese means more public interest in the governmental affairs. To-day Chinese bankers and business men have much more active participation in their government than ever before, and are surely graduating from a financial interest to a political interest. There will soon be a government in China like the government of the United States "of the people, by the people, and for the people." I believe such a development would make the foundation of Nationalist China as solid and secure as the foundation of Manhattan Island.

China has a definite program and definite principles by which to advance. There may be disturbances here and there, but Nationalist China will go on. China will not go "red." China does not believe in world revolution or any other fantastic scheme of upsetting the established economic order. She will mind her own business, as she always has done, and naturally, she expects the same from others. (Laughter and applause). She is awakened and is not going to sleep again. She solicits your friendly counsel, constructive criticism, and generous sympathy, as well as discerning patience. We overthrew monarchies and militarists, and we are suppressing Communists. We are very proud of what we have done. We are reconstructing our national affairs, and shall demonstrate to the world that the economic development of 460,000,000 peace-loving and cultured people is not only good for business, but for the benefit of all mankind.

Progress on Chinese National Railways

Peping-Liaoning Line

In 1929, when civil war broke out in China, the Peping-Liaoning Railway, formerly Peping-Mukden Railway, was forced to break into two sections with two administration offices, one in Tientsin and the other in Mukden. However, through the close co-operation of these two offices, the traffic of the line was not entirely interrupted and continued to give considerable satisfaction to the public. In the latter part of the year when the country was united, the unification of the Peping-Liaoning Railway became necessary in order to better the service for passengers and shippers.

Unification of the Line

The first step towards unification was to run the express trains through the two sections on regular schedule, and then consolidate the two administration offices, establishing the Head Office in Tientsin and abolishing the office in Mukden. Being confronted with the fact that a considerable volume of business originated in Mukden, it was decided that an office should be established there to handle that end. This office, named after the city, is called the "Seng Yang Office," and with this arrangement, the unification of the line took place on October 1, 1929.

Efficiency Commission

Upon unification, the railway was confronted with various problems of improvements and with a view to securing the highest efficiency a special commission was formed with the sanction of the Ministry of Railways to supervise these matters. This "Efficiency

Commission," with an experienced personnel has been doing its best for the good of the railway.

Hulutao Harbor

As the Peping-Liaoning Railway runs along the coast, a good commercial port is indispensable. Many years ago, the Railway Administration planned the construction of a harbor, selecting Hulutao as ideal for this purpose. The plans for the construction of this harbor was drawn up by the Railway Administration and with the approval of the Ministry of Railways, a contract was entered into with the Netherland Harbor Works Company to complete the work in five and a half years, at a cost of G.$6,400,000, payments to be made by monthly instalments of G.$95,000.

Loan Services Duly Repaid

The present administration is determined that its indebtedness be liquidated as soon as possible. In 1927, as a result of the Civil War then raging, the railway was compelled to postpone repayment of the Double Track Loan to the British and Chinese Corporation. In November, 1929, when the financial condition of the railway was slightly improved, the balance of the silver portion of the loan, amounting to $650,000, was paid up. A monthly instalment of £10,000 was also arranged to cover the sterling portion of the loan. Commencing from March, 1930, an additional monthly instalment repayment of $50,000 was made against the sterling portion of the loan so as to expedite the liquidation of the whole indebtedness at an earlier date. Since this arrangement was made, all payments have been met on due dates. The terms of the original British loan to the railway as to interest and amortization payments have been faithfully adhered to and the British and Chinese Corporation, recently expressed satisfaction that the credit of the railway has thus far been upheld.

Committee on Freight Rate

Realizing the bearing of freight rates upon the revenues of the railway itself as well as the development of trade and industry, a standing committee on freight rates has been formed.

Freight Rate on Grains Reduced

The recent famine conditions in the northern provinces materially increased the price of grain, and in order to transport cheaply the grain from other producing centers (especially from outside of the Great Wall) to these famine regions, the Railway Administration reduced the freight rate on December 5, 1929. As a result, the revenues of the railway have been increased, while lowering the price to the people.

Reduction of Freight Rate for Long Distance Haul

The Ministry of Railways having instructed the Peping-Liaoning Railway to make a careful revision of its freight schedules, a reduced schedule has been drawn up, taking sections of 100 kilometers each as the basis, the rates decreasing by percentages in every following section as compared with the foregoing sections. It ranges as follows :—

2nd section—	5	per cent	less	than	1st	section.		
3rd	,,	— 6	,,	,,	,,	,,	2nd	,,
4th	,,	— 7	,,	,,	,,	,,	3rd	,,
5th	,,	— 8	,,	,,	,,	,,	4th	,,
6th	,,	—10	,,	,,	,,	,,	5th	,,
7th	,,	—12	,,	,,	,,	,,	6th	,,
8th	,,	—14	,,	,,	,,	,,	7th	,,
9th	,,	—16	,,	,,	,,	,,	8th	,,
10th	,,	—18	,,	,,	,,	,,	9th	,,

The freight rate for less than a carload is to be charged in addition with an extra amount of 30 per cent of the rate for a carload. Under this new arrangement the long distance goods traffic of the railway will be encouraged. The above rates have been in force since January 1, 1931.

Commercial Conference

One of the outstanding undertakings in the history of Chinese National Railways was the "Commercial Congress" held by the Peping-Liaoning Railway in December, 1929. The Administration, having emphasized the principle of "Railway Commercialization," called for a Commercial Congress in which various officials of banks and commercial concerns along the line were represented. The Congress lasted for four consecutive days during which, Taxation and Levies, Reduction of Rates, Transportation and matters concerning improvement of railway service were thoroughly discussed. The railway has been exerting its best efforts to carry out the recommendations, some of which are already in force, while others are still under consideration or undergoing intensive trials.

Reorganization of Traffic and Locomotive Departments

In view of the fact that the distribution of locomotives and cars on most of the European and Japanese railways is under the control of one single department, while Chinese railways adopt the practice of placing the locomotive working under control of a locomotive department, and passenger and freight cars under the traffic department, the practice has given rise to inevitable disputes and clashes of authority. The Peping-Liaoning Railway therefore, reorganized its traffic and locomotive departments by putting the control of all locomotives and cars under one single department, taking effect on August 1, 1930. The name of the traffic department was changed to the "transportation department" and that of the locomotive department to the "works department." Both departments are headed by a superintendent and an assistant superintendent. There are six divisions under the transportation department; the Establishment; Audit and Stores, Operating, Telegraph, Traffic and Technical Divisions, while the works department embodies three divisions; the Secretarial, Technical and Accounts and Auditing Divisions. Each division has its own assignment of work to look after. Through this change, the control of locomotive working is placed under the transportation department to cope with the distribution of cars, and the telegraph division now deals only with telegraphic messages, telephones and wireless stations, leaving electric power and lighting to the works department. This reorganization has resulted in greater efficiency and co-ordination.

Freight Paid at Destination

Heretofore shippers have been required to pay freight charges on delivery of their goods to the railway for transportation, but the Railway Administration has accepted payment on arrival of goods at destination, since May 1, 1930.

Railway Risk Transportation

The Railway Administration has also decided to practice Railway Risk Transportation. Starting with carload lots, the system has been extended to cover all shipments. This arrangement commenced on October 25, 1930, and a special staff was carefully selected to supervise the work.

Peping-Kirin Through Service

For the convenience of the travelling public, the Peping-Liaoning Railway inaugurated on November 10, 1930, a through passenger train daily from both ends between Peping and Kirin.

Nanking-Peping-Mukden Triangular Express Train

In accordance with the instructions of the Ministry of Railways, a triangular train service connecting Nanking, Peping and Mukden was inaugurated by the Peping-Liaoning Railway on February 9, 1931. Three trains start simultaneously from Pukow (opposite Nanking), Chienmen (Peking) and Mukden five times a week, on Sundays, Mondays, Tuesdays, Thursdays and Fridays, filling a long-felt need for the resumption of direct train service between Nanking, Peping and Mukden. As soon as necessary rolling stock can be acquired, a daily service will be inaugurated.

Profits

The Peping-Liaoning Railway netted a profit of $19,001,908.99, at the end of the year 1929. The total revenue for the year was $37,514,590.10, while the total operating expenses amounted to $18,512,682.11. The total revenue for the year ending 1930, amounts in round numbers to $37,500,000.00 with operating expenses at $20,000,000,000, leaving a profit of approximately $17,000,000.00. From these figures, it is seen that the Peping-Liaoning Railway has done a large business during the two years carrying out many improvements and rendering costly services to the public.

Government Railway Earnings

The revenue of the following 13 Government railways, amounted to $104,848,368, during 1930, an increase of $1,059,622, over 1929.

Railways	*Revenue for 1929*	*Revenue for 1930*	*Increase or Decrease.*
Tientsin-Pukow ..	$11,990,888.00	$10,786,648.00 (—)	$1,213,240.00
Peiping-Liaoning ..	37,829,000.00	37,439,842.00 ( )	389,158.00
Shanghai-Nanking .	12,120,563.00	12,558,638.00 (+)	438,075.00
Shanghai-Hangchow-Ningpo . ..	5,855,415.00	6,641,712.00 (+)	786,297.00
Peiping-Suiyuan ..	5,611,998.00	4,667,738.00 (—)	944,260.00
Chengting-Taiyuan .	5,172,337.00	5,844,200.00 (+)	671,863.00
Taokow-Chinghua ..	993,291.00	1,406,273.00 (+)	412,982.00
Canton-Kowloon, ..	1,396,886.00	1,568,044 (+)	171,158.00
Hupeh-Hunan ..	2,188,806.00	1,471,330 ( )	717,476.00
Kiaochow-Tsinan ..	12,202,249.00	12,314,937.00 ( )	112,688.00
Nanchang-Kiukiang	1,439,245.00	1,234,395.00 (—)	204,850.00
Canton-Shiukwan .	3,625,748.00	5,670,454.00 (+)	2,044,706.00
Hulan-Hailun ..	3,353,320.00	3,244,157.00 (—)	109,163.00
	$103,788,746.00	$104,848,368.00 (+)	$1,059,622.00

Official 1930 statistics for the Peiping-Hankow, Lung-Hai, Kirin-Changchun, Changchow-Amoy, Taonan-Anganchi, Shenyang-Hailun, Kirin-Hailun and Kirin-Tunghua are not yet available, but the following returns for the Manchurian lines were given out in Mukden on February 15:

PEIPING-MUKDEN LINE

Passenger receipts	$15,804,420
Passengers carried	1,347,845 people
Goods receipts	$20,911,592
Goods tonnage carried	8,611,243 tons
Total receipts	$36,716,012

MUKDEN-HAILUNGCHENG LINE

Passenger receipts	$2,471,165
Passengers carried	1,347,855 people
Goods receipts	$4,905,772
Goods tonnage carried	758,155 tons
Total receipts	$7,376,937

SSUPINGKAI-TAONAN LINE

Passenger receipts	$2,052,032
Passengers carried	962,634 people
Goods receipts	$5,315,949
Goods tonnage carried	684,251 tons
Total receipts	$7,367,982

HULAN-HAILUN LINE

Passenger receipts	$952,894
Passengers carried	623,504 people
Goods receipts	$2,969,606
Goods tonnage carried	684,254 tons
Total receipts	$3,922,501

KIRIN-CHANGCHUN LINE

Passenger receipts	$927,206
Passengers carried	739,253 people
Goods receipts	$2,013,433
Goods tonnage carried	684,254 tons
Total receipts	$2,967,550

KIRIN-HAILUNGCHENG LINE

Passenger receipts	$817,123
Passengers carried	283,024 people
Goods receipts	$937,854
Goods tonnage carried	323,303 tons
Total receipts	$1,754,977

KIRIN-TUNGHUA LINE

Passenger receipts	$491,960
Passengers carried	366,797 people
Goods receipts	$1,140,786
Goods tonnage carried	474,427 tons
Total receipts	$1,632,747

TAONAN-ANGANGCHI LINE

Passenger receipts	$729,372
Passengers carried	418,349 people
Goods receipts	$867,039
Goods tonnage carried	317,495 tons
Total receipts	$1,596,411

TSITSIHAR-KOSHAN LINE

Passenger receipts	$398,626
Passengers carried	270,617 people
Goods receipts	$1,155,888
Goods tonnage carried	319,160 tons
Total receipts	$1,554,515

GRAND TOTAL

Passenger receipts	$24,644,803
Passengers carried	12,082,937 people
Goods receipts	$40,244,833
Goods tonnage carried	13,223,264 tons
Total receipts	$64,889,636

Converted into Gold currency, the above total receipts amount to only G.Y26,000,000 odd

Facing Bankruptcy

The general financial position of the Government Railways was dwelt upon by Minister Sun Fo in his opening speech before the National Railway Transportation Conference held in Nanking during March. Minister Sun Fo told his audience that: "With the cessation of military operations, and the restoration of national unification, the foremost task of the Ministry was the reorganization and development of the existent railways. The various railways were now on the verge of bankruptcy, the total obligations amounting to the staggering figure of more than $1,000,000,000. According to reports submitted by the Shanghai-Nanking Railway Administration, it had to provide almost three million dollars this year to meet loan obligations and several million dollars for the purchases of new rolling stock. The number of freight cars available on the Peiping-Hankow line had dwindled from 4,000 to 1,000."

Increased Tariffs

Since the enforcement of the revised passenger and freight rates on March 16, a substantial increase in the income of the Shanghai-Nanking and Shanghai-Hangchow-Ningpo Railways is reported. The average daily receipts on the Shanghai-Nanking Railway total $40,000, an increase of nearly $10,000. On the Shanghai-Hangchow-Ningpo Line, the income has increased by one-third, the Administration receiving over $20,000 daily. If the increase is maintained the 1931 revenue of the Shanghai-Nanking may reach $15,000,000, and the Shanghai-Hangchow-Ningpo $8,000,000.

Tariffs on other Government railways are also to be increased after May 1, as follows:—

Taokow-Chinghua and Kiaochow-Tsinan Railways, 20 per cent on both passenger and freight tariffs;

Nanchang-Kiukiang Railway, 15 per cent on passenger and freight tariffs.

Wuchang-Changsha section of the Canton-Hankow Railway, 10 per cent on passenger and freight tariffs.

Peiping-Hankow, Tientsin-Pukow, Peiping-Suiyuan and Lung-Hai Railways, 15 per cent. on freight tariff only.

On the Peiping-Liaoning, Chengting-Taiyu, Canton-Kowloon Railways, and Canton-Shiuchow section of the Canton-Hankow Railway, no increase in rates will be made for the present.

Rehabilitation Program

To handle the increasing volume of business on the various Government railways, new rolling-stock is necessary and the Purchasing Commission is preparing to rush tenders for 200 cars and six "Pacific" type locomotives.

The Tientsin-Pukow Railway Administration is increasing the efficiency and safety of its service and all bridges damaged by the military operations last year, are being repaired or replaced by new ones.

Large-scale rehabilitation of all the Government lines, such as the repair of railway bridges, renewal of dilapidated tracks and provision of modern equipment, estimated to cost $100,000,000, will be carried out over a period of three years.

With two-thirds of the British Boxer Indemnity Refund carmarked for the improvement of the railways, it is understood that the necessary funds will be provided as the rehabilitation program is carried out.

New Manchurian Lines

Rapid strides are being made by the Northeastern provinces in the development of communications. Three additional railways in Liaoning province will be put in hand this year by the Northeastern Communications Committee. One line will connect Liaoning with Kirin by linking up Chaoyangchen, with Fusung, a distance of 49 kilometers. The Shanyang-Hailung Railway Administration will be responsible for the construction of the line which is estimated to cost $2,119,900, to be appropriated from the earnings of the railway. Work is expected to start by the middle of April.

The leading officials and merchants of Pehchenhsien, in western Liaoning, have also petitioned for the construction of a light railway from Pehchenhsien to Kowpangtse, about 17 miles to the south. As the cost of construction is only 400,000, there will be little difficulty in raising this amount between the Government and the merchants. The Peiping-Liaoning Railway will carry out the construction.

Another line under consideration is one between Tunghwa and Changpaishan in eastern Liaoning. The plans call for the building of a highway at a cost of $358,800, and as more funds are available, a railway will be built. Work on the highway is to be started in April and completed by the end of November.

A scheme proposed by Mr. Kao Yun-kun, Managing-Director of the Hulan-Hailun Railway, for the construction of a branch line from Suihwa station to Holikang, a coal-producing district, has been approved by the Heilungkiang Provincial Government. The projected line will be 560 kilometers in length and is estimated to cost $30,000,000. It was planned to raise two-thirds of the amount jointly by the Heilungkiang Provincial Government, the Holikang Colliery and the Hulan-Hailun Railway Administration and a loan raised for the balance ($10,000,000) with the coal mine as security. It is now reported that the management has opened negotiations with the Soviet for a loan.

Kirin-Tungkiang Railway

Work on the construction of the Kirin-Tungkiang Railway will be started next month. The railway, about 700 miles in length will run in a general northeasterly direction from Kirin through Shulan, Wuchang, Maoerhshan, Pingchow, Fangcheng, whence it will follow the course of the Sungari River to Sansing, Huachuan, Fuchin, and Tungkiang. The northern section—from Maoerhshan to Tungkiang—will be constructed first. Work on the road bed will be completed before the end of the year when the laying of rails and sleepers will begin. The entire railway will take five years to build; the first section to be ready for traffic by 1934 and the remaining portion in 1936.

The total cost of construction is estimated at $25,000,000. The initial expenditure of five million dollars for the first year will be supplied by a native banking group; the balance to be provided by the Kirin Provincial Government in annual instalments of $5,000,000. General Chang Tso-hsiang, Chairman of the Kirin Provincial Government says that he will endeavor to raise the entire sum within the province without resorting to outside help, so as to make the railway a provincial enterprise both in name and in fact.

Sintsu Coal Mine Branch

The Northeastern Communications Committee, is also to start constructing the railway connecting Fanshanjen of the Tungliao-Tahushan branch line of the Peking-Mukden railway with the Sintsu Coal Mines. The line will be Government-owned and built by the engineers of the Peking-Mukden Railway, the Administration acting as contractors. The coal mines of Sintsu are operated by the Chinese company Yufu in Mukden, and the quality of the coal is considered as equal to the Fushun output.

Huainan Light Railway

Construction of a light railway linking up the Huainan mining district in eastern Anhwei with the important river port of Wuhu, on the Yangtse river, is about to be started. The National Reconstruction Commission, has purchased over 700 tons of steel rails in Shanghai, and as soon as the consignment reaches its destination, the building of the railway will begin. The proposed railway is about 130 miles long and cost of construction is estimated at $4,000,000.

The Huainan coal mine possesses abundant anthracite deposits. When the mine was first opened, the daily output was about 100 tons of coal, but the yield has been increased to 30,000 tons daily.

Shantung Railway Extensions

The Ministry of Railways intends to build a branch railway from Tsinan to Taokow, in northern Honan, through southern Hopei. The Kiaochow-Tsinan Railway has however petitioned for a prior extension to Lintsing, a distance of 60 miles from the Shantung Provincial Capital. The total cost of construction is estimated at $6,000,000; but by utilizing available railway material from the existing railway, the expenditure may be reduced by one half. The railway recently purchased one hundred 40-ton freight cars from Japan and now proposes to purchase an additional 200 cars in the near future. The Changtien-Poshan branch of the Kiao-Tsi Main Line is to be extended to connect with the Tientsin-Pukow Railway at Taianfu *via* Laiwu, approximately 100 miles.

Lung-Hai Progress

The Lung-Hai Railway Administration announces that construction of the Lingpao-Tungkwan section of the line will be concluded in September. The section now being built is 72 kilometers in length, passing through the typical loess formation along the south bank of the Yellow river with unusually heavy earth work and tunnelling necessitated.

Construction of this section has been repeatedly interrupted by military disturbances during the past years. About 90 per cent of earth work has been completed. Seven out of 11 tunnels have been finished with two others scheduled to be opened within a few weeks. The two uncompleted tunnels, one in Lingpao and in Tungkwan are long and difficult, but the former will temporarily be supplemented by a variant built along the Yellow river for temporary routing of trains, and the latter going through the city of Tungkwan will not affect the reaching of that city for the time being.

Steel bridges and rails have been purchased out of a portion of the Belgium returned Boxer Indemnity Fund allotted to Lung-Hai and they are being transported from Pukow to Lingpao. Erecting of bridges is now in full swing and laying of tracks will soon be initiated. It is expected that rails will reach Wenhsiang Hsien in the latter part of June and Tungkwan in October. The extension of the line will be followed immediately with the aim of reaching Sianfu by the end of 1932.

Arrangements are now being made to push forward the construction of this section and Mr. Ning Hung-hsuan, chief engineer of the Lung-Hai Railway, has been instructed to proceed to Tungkwan and recruit workers amongst the refugees in conjunction. Surveys of the Tungkwan-Sian section will be hastened so that actual construction work may be started as soon as possible.

The material for the building of the large railway bridge at Hankukwan has arrived at its destination. It is anticipated that railway communications as far as Tungkwan on the Lung-Hai Railway will be open by June of this year.

It is also reported that the Ministry of Railways has decided to build this year a branch line from Tungkwan to Anyiin, in Southern Shansi.

Chungshan-Fatshan Railway

Following the Ministry of Railway's decision to connect Fatshan and Chungshan by railway line, the Yueh-Han Railway Administration has despatched engineers and experts to re-survey the whole line, a distance of 70 miles.

The cost of construction is estimated at $13,000,000 of which $6,000,000 will be appropriated from the Boxer Indemnity Refund, while the balance is to be raised from the people. The total length of the bridges will be about 12,000 feet.

A branch line with a length of 5½ miles starting from Siulam, *via* Kiuchow and Kinpao, to Koochen is also to be constructed so as to connect the Kongmoon-Sunning Railway.

Canton-Kowloon Dispute

The Chinese section of the Canton-Kowloon Railway is pressing the British section in Kowloon for revision of the railway agreement.

The Chinese section of the railway contends that under the present agreement, it is reaping too small a percentage of profits. The railway is 112 miles long, of which 89½ miles were constructed by the Chinese, but, according to the present arrangement, the Chinese section receives only 65 per cent of the receipts.

It is argued that inasmuch as the Chinese section is nearly 80 per cent of the railway, its percentage should also be nearly 80 per cent. In other words, the Chinese claim is based on mileage.

The management of the British section points out that the mileage standard cannot be applied because there are several long tunnels on the British section, the construction of which was more expensive than any other part of the line.

Sir William Peel, Governor of Hongkong, is understood to have accepted, in principle, that the agreement be revised but expresses the view that the Chinese section should be improved until it is on a par with the British. In recent years the Chinese section has deteriorated in many respects, and for this reason the running time for express trains has risen from three hours and 50 minutes to four and a half hours.

Leading Tool Companies in Merger

ANNOUNCEMENT has been made of a merger between two of the leading American manufacturers of fine tools—The Millers Falls Company of Millers Falls, Mass. and the Goodell-Pratt Company of Greenfield, Mass. The Millers Falls Co. will be the operating company and the officials are to be the present officials of the Millers Falls Company—Philip Rogers, President; George U. Hatch, Vice-President; John W. Smead, Vice-President and Earl D. Holtby, Treasurer. Wm. M. Pratt, President of the Goodell-Pratt Company has been elected a member of the Board of Directors, composed of the following additional members: E. P. Stoughton, Chairman, Philip Rogers, E. D. Holtby, J. W. Smead, G. U. Hatch and G. C. Lunt. Mr. Roger L. Bracken, Export Manager of Millers Falls Company will supervise the export sales of both organizations.

This consolidation will bring together the manufacturing experience and merchandising ability of the two concerns, with a combined background of over a hundred years of fine tool manufacturing and merchandising. The two lines of tools will continue to be manufactured under their present internationally-known trade marks.

History of the Companies

The Millers Falls Company has been engaged in the manufacture of high grade tools since 1868; and was the first of the tool manufacturers to bring out a hand drill. It has also led in the development of numerous other products. It has been a pioneer in the distribution of hack saw blades.

Since 1927, the Millers Falls Company has become one of the leading factors in the electric tool field. The marketing of these tools is handled by a corps of specially trained salesmen. The Millers Falls Company has been one of the leaders in the national movement aiming towards concentration of purchases and has developed a broad line consisting of twelve major divisions to help the hardware distributor effect the economics that come from this policy. These twelve divisions include electric tools, hack saw blades and frames, breast drill, automatic tools, levels, mitre boxes, braces, planes, hand drills, auger bits, nail sets and punches.

The Goodell-Pratt Company was started in 1888, manufacturing automatic drills, hand drill, breast drills, drill chucks and automatic screw drivers. In 1900 the manufacture of precision tools was started under the name of the Massachusetts Tool Company. This company together with the Lavigne Micrometer Company of New Haven, Connecticut, both of which had been acquired by the Goodell-Pratt Company, controlled many patents which form the basis of the Goodell-Pratt precision tool line. The factory equipment of the Goodell-Pratt Company is among the finest in the industry for the manufacture of precision tools.

William M. Pratt, President of the Goodell-Pratt Company, has long been identified with the tool industry and has travelled widely abroad developing the foreign markets for this company. The slogan "1,500 Good Tools," familiar to tool users throughout the world is an indication of the breadth of the Goodell-Pratt line.

The Goodell-Pratt catalog of 400 pages, lists among others the following classifications:

Machinists' and Precision Tools, Iron and Wood Levels, Chisels and Punches, Glass Cutters, Automatic Hand and Breast Drills, Hack Saw Blades and Frames, Automatic Ratchet and Plain Screw Drivers, Automotive Tools, Vises, Electric Drills, Mitre Boxes, Light Shop Equipment, Tap Holders, Carpenters' Tools.

The overseas customers of both companies will continue their contacts with each Company direct as heretofore.

An Appreciation

As a rule we refrain from reproducing the many flattering references to the value of *The Far Eastern Review* as the representative industrial magazine of the field it covers, holding to an old fashioned editorial belief that the best advertisement of a newspaper, is the newspaper itself.

It is with pleasure, however, that we reproduce the following appreciative editorial from *The Nautical Magazine*, of Glasgow, a publication now in its 121st year, and recognized throughout the world as the leading authority on mercantile marine matters.

"Mr. George Bronson Rea, the editor and publisher of this excellent monthly which deals so thoroughly with Far Eastern trade, finance, shipping and engineering, is to be congratulated on the production of one of the most important monthly journals of the Far East which should be closely studied by those who desire to increase British commerce. The enormous activities displayed in its pages cover the principal ports and places along the Far Eastern seaboard. The photographs and drawings are as impressive as the authoritative articles which fill the pages of the production and which deal with such subjects as motor shipbuilding in China and Japan, oil refining, electrical power, the fishing industry, radio, waterworks, building, roadmaking, and commercial development over an extensive area. Banks, factories, and shipping houses are furnished with such important information that they should in their own interests study the pages of this unique monthly which conveys the views expressed by Japanese and other correspondents.

"A matter which is of particular interest to readers is contained in the Marine Section of the journal. It gives details of the new dockyard which has been opened at Kowloon and which has four patent slipways for vessels up to the length of 325 feet, and two fitting-out wharves with heavy-lifting cranes and railways which cover the whole plant. The general use of machinery of modern type driven by electricity brings the new yard into line with up-to-date shipbuilding organization. China owns about 240,000 tons of coastwise shipping, but half of it is uneconomical as the ships are so old and out of date and the expense of keeping these ancient steamers in repair leaves no profit whatsoever."

World Wide Depression Subsiding

Signs are apparent of a steady though gradual improvement in world trade, declares James A. Farrell, Chairman of the National Foreign Trade Council, in issuing the call for the Eighteenth National Foreign Trade Convention, to meet in New York on May 27, 28 and 29 next. World exports for 1930, as estimated by the Council, amounted to about $27,000,000,000, almost six and a half billion dollars less than the export trade of 1929. In actual volume of export trade, however, figures now available show that, accounting for reduction in prices, the world in 1930 carried on 90 per cent of the export trade of 1929, and almost a billion dollars more in exports than before the war.

In urging American foreign traders to consider very carefully the problems of the present year, Mr. Farrell says:

"There are indications that the world wide depression in business, with which we have been dealing for several months, is subsiding and that the upturn is beginning.

"Our commerce confronts a situation which merits the consideration of all concerned in foreign trade. It is a time for thorough examination of economic conditions, and for practical demonstration of that spirit and habit of co-operation that so signally marks American foreign trade practice."

ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW

DEPARTMENT OF COMMERCE
JUN 30 1931
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THE ELECTRIFICATION OF CHINA

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Electric Power Development in Fushun

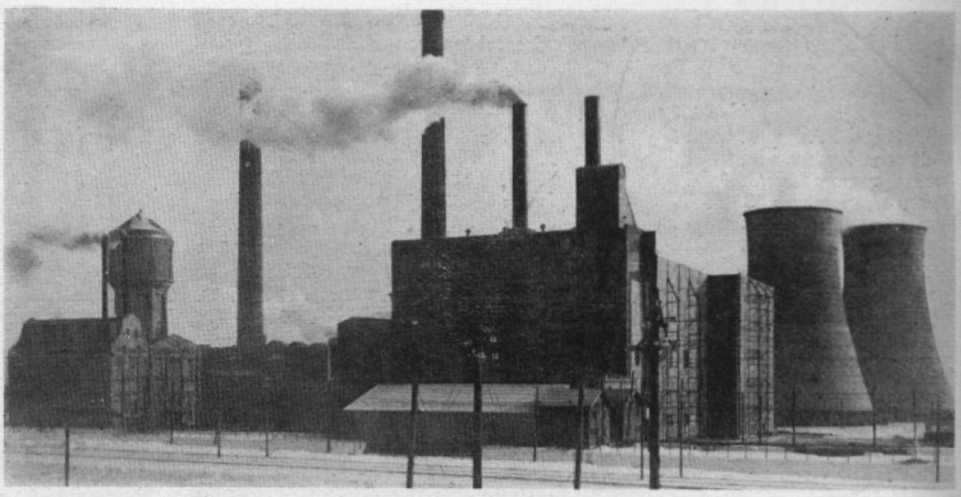
By Y. OKA, Electrical Engineer

THE output of electric power in Fushun has increased very rapidly and widely since 1908, when the mine was opened, as can be seen from the following figures :

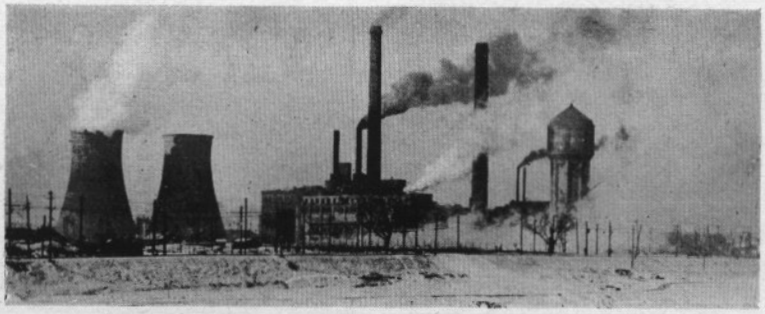
1908	170,426 kw.h.
1910	2,535,123 ,,
1912	7,109,539 ,,
1914	14,560,149 ,,
1916	34,144,616 ,,
1918	67,829,704 ,,
1920	59,537,961 ,,
1922	64,047,185 ,,
1924	91,126,516 ,,
1926	122,121,997 ,,
1928	153,861,410 ,,
1930	190,650,000 ,,

Power Stations

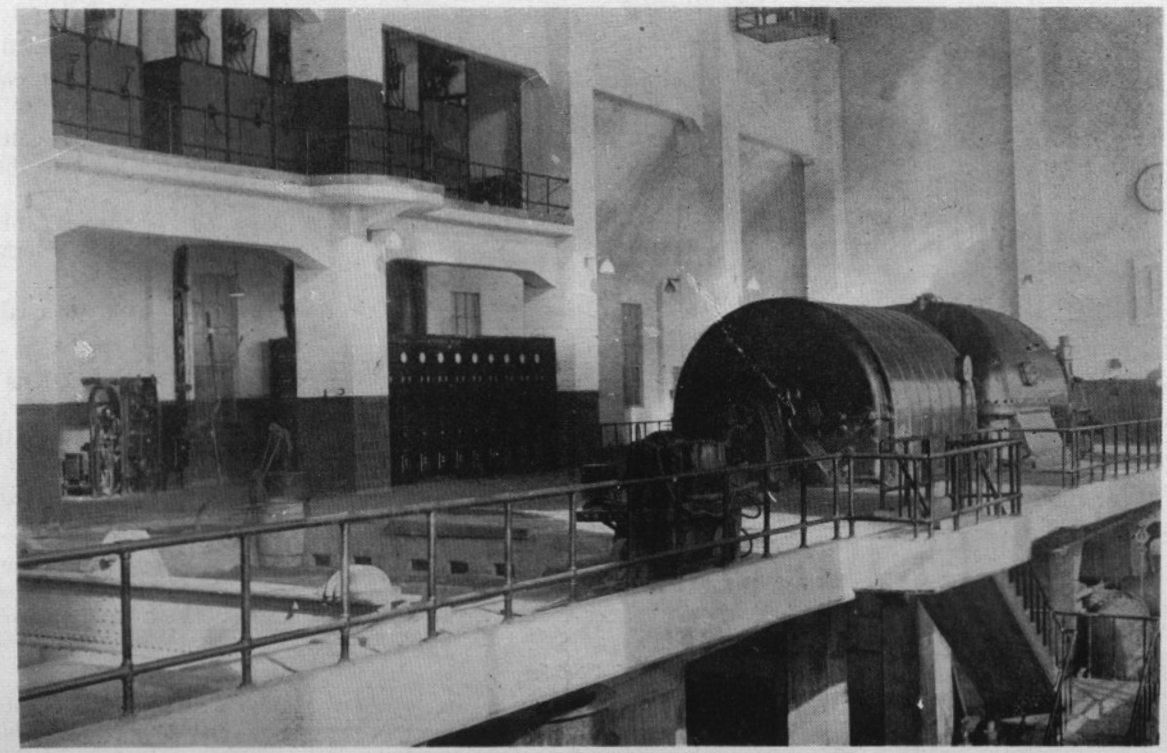
The Fushun mines now operate three power stations : known as the Mond gas and the Taikanton No. 1 and No. 2, having an aggregate rated capacity of 67,000 kw. A new 2,500 kw. turbo-generator set is being erected in the Taikanton No. 2 station, and when completed, the Mond gas plant (2 by 1,500 kw., 3 by 3,000 kw., and one 1,200 kw.,) will be discontinued.



Taikanton No. 1 and No. 2 Power Stations, from North



Taikanton No. 1 and No. 2 Station, from East



25,000 kw. Generator, Taikanton No. 2 Station

THE MOND GAS POWER STATION

The Mond gas power station was installed during the period 1913-1918, utilizing inferior hard coal of about 4,000-5,400 calories and 30-50 per cent ash content. The gas plant is divided into three banks ; two are of the Mond's system bye-product recovery type and one is Lynn's bye-product recovery type with a coal consumption of about 740 tons per day for the three plants. Each bank includes a complete tar and ammonia recovery apparatus ; gas washer, ammonia absorber, first and second coolers, gas governor, air blowers, gas exhausters, heat exchanger and other necessary accessories.

The tar produced is sent to the fractional distillation plant to recover creosote, hard pitch and a solution of sulphate ammonia which is pumped up to the vacuum evaporator and the centrifugal drier. These products are exported to Japan and other Oriental markets.

Gas is now piped to the boiler house at about 12 cm. of water column pressure to burn in the furnaces as a fuel, but after closing down the Mond power plant, the gas will be transmitted to the Taikanton station through a high pressure main of about on km. in length.

In the winter season, about 10 per cent of the total gas output is supplied to isolated boilers in the public buildings in the city of Fushun for heating purposes.

MOND GAS POWER HOUSE EQUIPMENT

BOILER ROOM

Type	*W.I.F.*	*W.I.F.*
Maker	*B. & W.*	*B. & W.*
No. of sets ..	8	6
Heating surface m^2	374	770
Economizer H.S. m^2	93	223
Fuel	gas	gas
Steam pressure Kgr/cm^2 ..	12.6	12.6
Steam temperature °C ..	330	270
Normal evaporation Kgr/hr...	5,500	12,200
Chimney	Brick 45.75 m. high	Steel 17 m. high

GENERATOR HOUSE

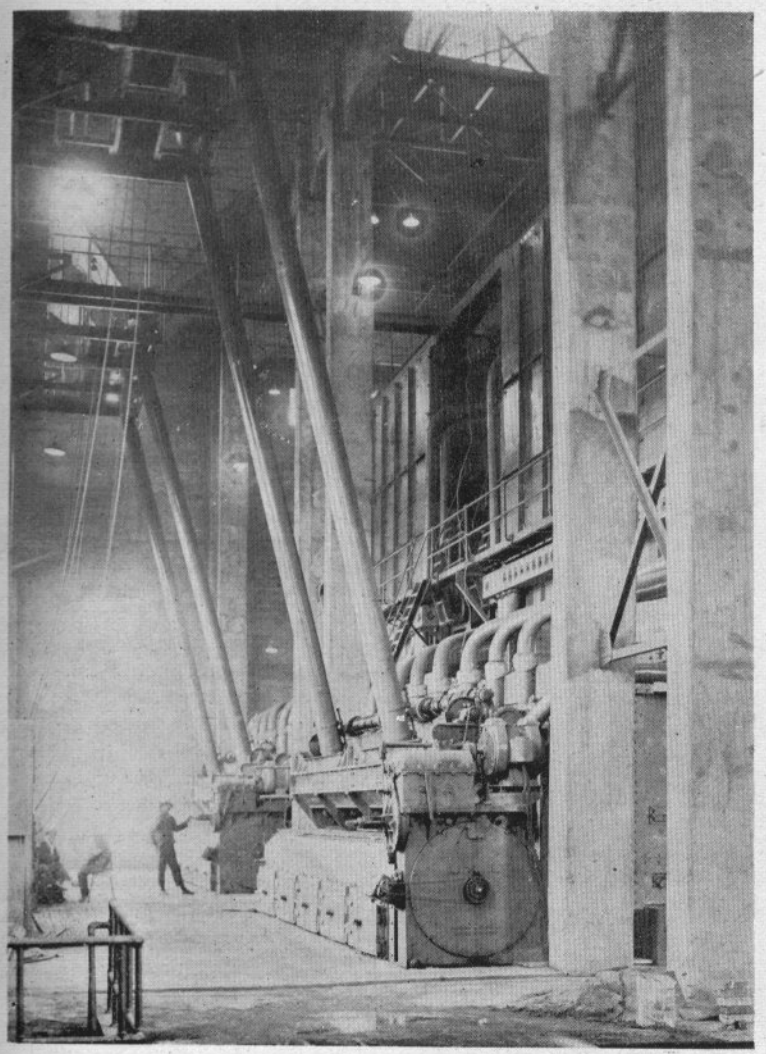
Type	*Horizontal type condensing steam turbine*	*Horizontal type bleeding steam turbine*
Maker	*General Electric Co.*	*A. E. G.*
No. of sets	3	2
Unit capacity kw.	3,000	1,500
Steam pressure Kgr/cm²	11.2	11.2
Steam temperature °C	298	298
Generator voltage	2,200	2,200
Phase	3	3
Cycle	60	60
Exciter kw.	25	16
Installed year	1916	1914

The Taikanton No. 1 Station

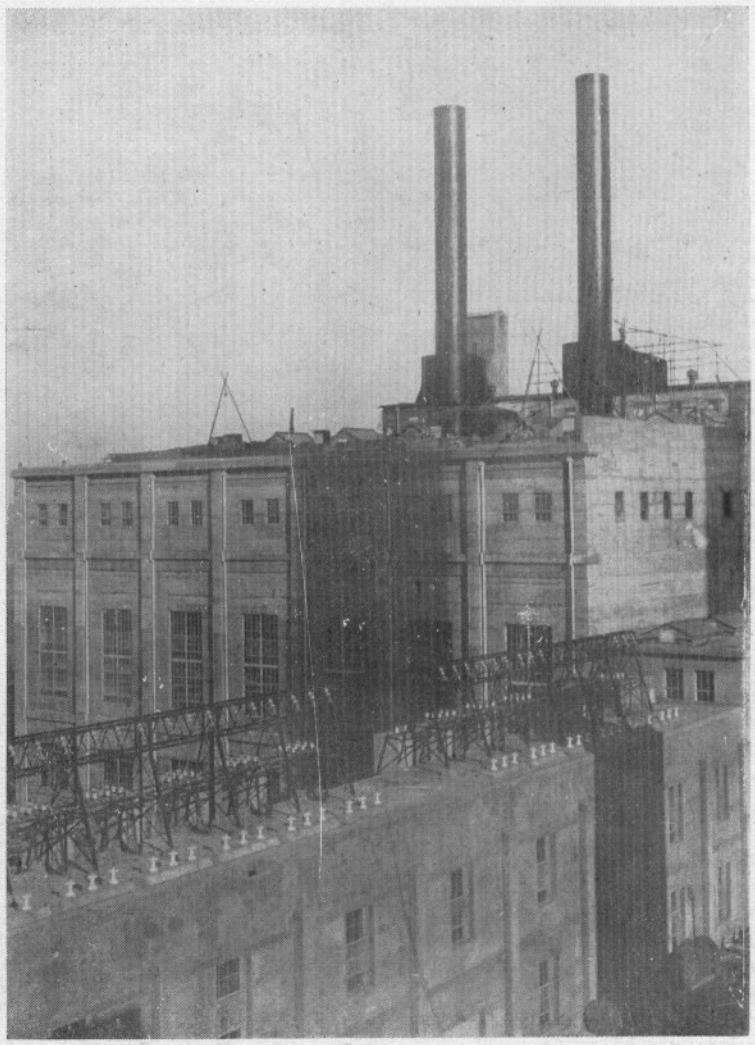
(1) No. 1 Station has a generating capacity of 30,000 kw. installed during the period 1921-1924. The coal used averages 5,000-5,500 calories per kgr., analyzing 20-25 per cent ash and 5-6 per cent moisture. The greater portion of small sized coal is sent to the pulverized coal plant and larger sizes to the chain grate stoker. Heavy clinkering troubles are not experienced.

BOILER ROOM

Type	*W.I.F.*	*W.I.F.*	*Garbe, 3 drum.*
Maker	*B. & W.*	*B. & W.*	*Mitsubishi*
Number	4	2	2
Heating surface m³	775	775	630
Superheater H.S. m²	230	230	170
Type of economizer	*Plain cast iron tube.*	*Plain cast iron tube.*	*Ribbed tube, cast iron.*
Economizer H.S.m³	380	380	1,040
Type of coal combustion and fuel.	*Chain grate.*	*Mond gas, powdered coal.*	*Mond gas, powdered coal.*
Steam pressure Kgr/cm³	17.5	17.5	17.5
Steam temperature °C	315	315	315
Normal evaporation Kgr/hr.	18,000	20,000	24,500
Maximum „ „	23,000	25,000	29,500
Draft	natural	natural	natural
Chimney height m.	80 (reniforced concrete)	90 (reniforced concrete)	



Boiler Room. Taikanton No. 2 Station



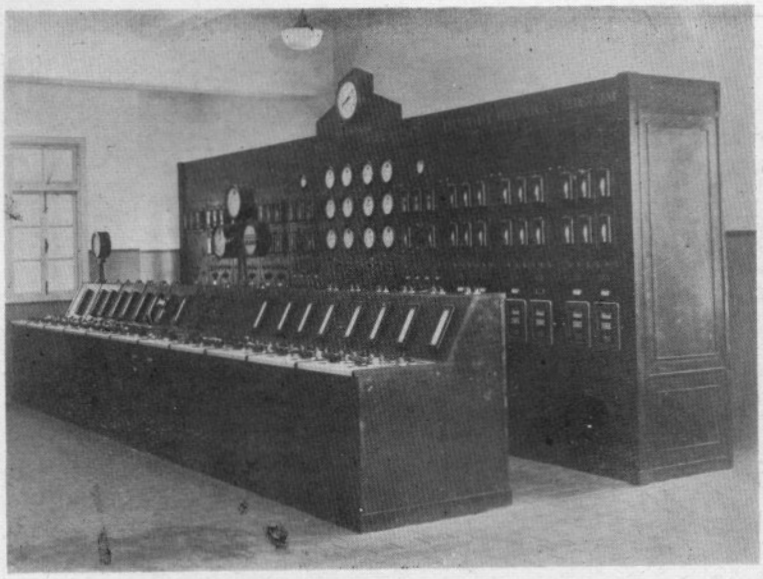
Electric Power Station, Fushun Collieries

PULVERIZING PLANT EQUIPMENT :

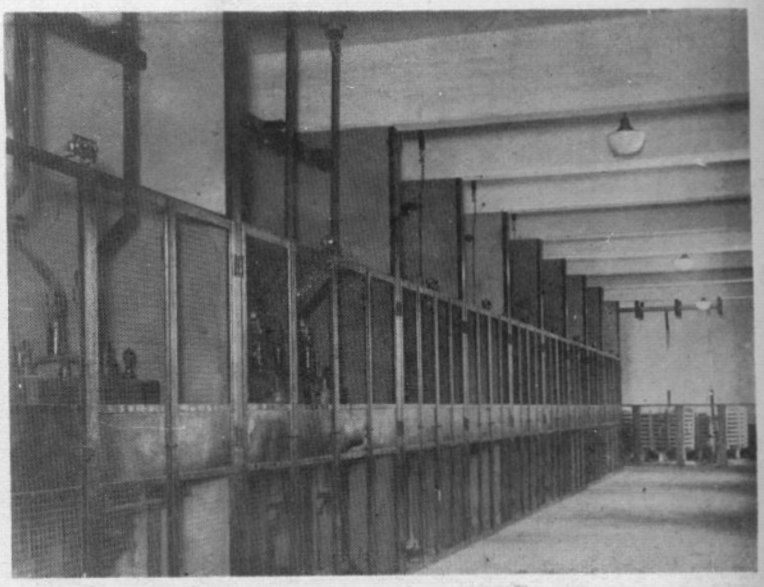
Type	*Holbeck, central system.*
Capacity of coal bunker	450 tons
Type and capacity of dryer, rotary type	2, each 15 tons/1 hr.
Capacity of mill	3, each 5 „
Capacity of pulverized coal bunker	2, each 50 tons
Distributing system	air distribution with blower, no return system.
Standard fineness 100.200 mesh.	80%, 65%.
Installed	1921

The powdered coal burners are of high speed type, with an average combustion rate in the furnace of about 15,000 B.T.U. per cubic ft., and 18,000 B.T.U. maximum, without ash trouble. The powdered coal firing boiler has a bottom water screen, not front and side walls, with air cooling on side and front walls. Secondary air, therefore, is supplied through a wall air duct. Ash is removed from the bottom ash boxes sealing with water. Mixed firing of Mond gas and powdered coal gives very good results and better efficiency as compared with single firing.

The stokers are of a modern forced draft compartment type, able to burn at a rate of 20,000-25,000 B.T.U. per cubic ft. of furnace volume, without clinker trouble and higher loss in ash.



Controlling Board, Taikanton No. 2 Station



Interior of Taikanton Electric Power Station, Fushun Collieries (Switch Room)

GENERATOR HOUSE EQUIPMENT

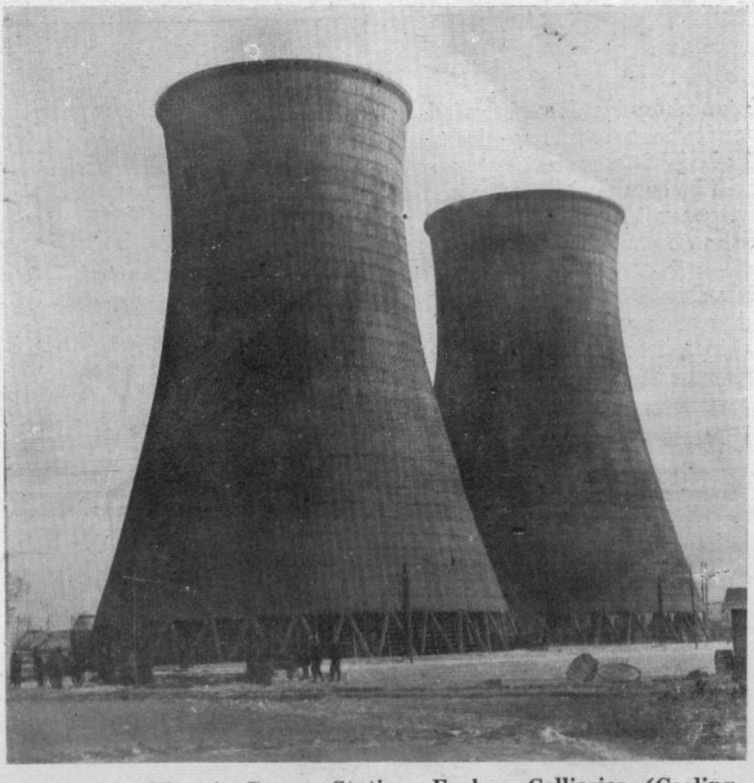
	No. 1	No. 2	No. 3
Type	*Horizontal, single casing*	*Horizontal single casing*	*Horizontal double casing*
Maker	*G.E.*	*G.E.*	*Mitsubishi-S.S.W.*
Unit capacity kw.	5,000	12,500	12,500
Cos	.8	.8	.8
Steam pressure Kgr/cm²	15.6	15.6	15.6
Steam temperature °C	245	300	300
Vacuum %	95	95	95
Condenser surface M²	710	1,950	1,635
R.P.M.	3,600	1,800	3,600
No. of bleeding	—	—	single
Generator voltage	2,200	11,000	11,000
Phase	3	3	3
Cycle	60	60	60
Exciter kw.	100		50
Installed	1921	1921	1924

The 5,000 kw. turbo-generator has been provided with an automatic steam desuperheater to reduce the steam temperature and is always operated as a source of auxiliary power for No. 1 and No. 2 station. To the main bus, power is supplied through the step-up transformer directly connecting at the generator terminal.

EVAPORTING PLANT.—Using a bleeding steam from No. 3 turbine at a pressure and temperature 1.47 kgr./cm² gauge, 133°C respectively, double effect evaporators and a deaerator are installed to distil make up water and extract gas in feed water. Capacity of the evaporating plant is sufficient to treat all the feed water for the station boiler plant.

SWITCH BOARD GALLERY.—The switching gallery is installed on three floors; the top floor being divided into two sections, one for oil circuit breaker and the other for desk type controlling board and meter and relay board. The middle floor is also in two sections, one for bus-bar of duplicate system, and the other for choking coils and disconnecting switches. The bottom floor is used for the step-up transformer of the 5,000 kw. generator and for auxiliary power oil circuit breakers. Eight feeders, three tie lines between power stations and the generator mains are connected to the bus-bar. Generators are protected by differential and over load relays with G.E. induction type overload relays for all feeders. Bus-bar and conductors are segregated by a partition wall and the source of a remote control of all mechanism is direct current from batteries. Each feeder is rated 5,000 kw. power supply with rupturing capacity of 350,000 kva. or 600,000 kva.

RECOOLING EQUIPMENT OF CONDENSER COOLING WATER.—A spray cooling pond is provided for recooling circulating water and is able to deal with water for 25,000 kw. running in winter season.



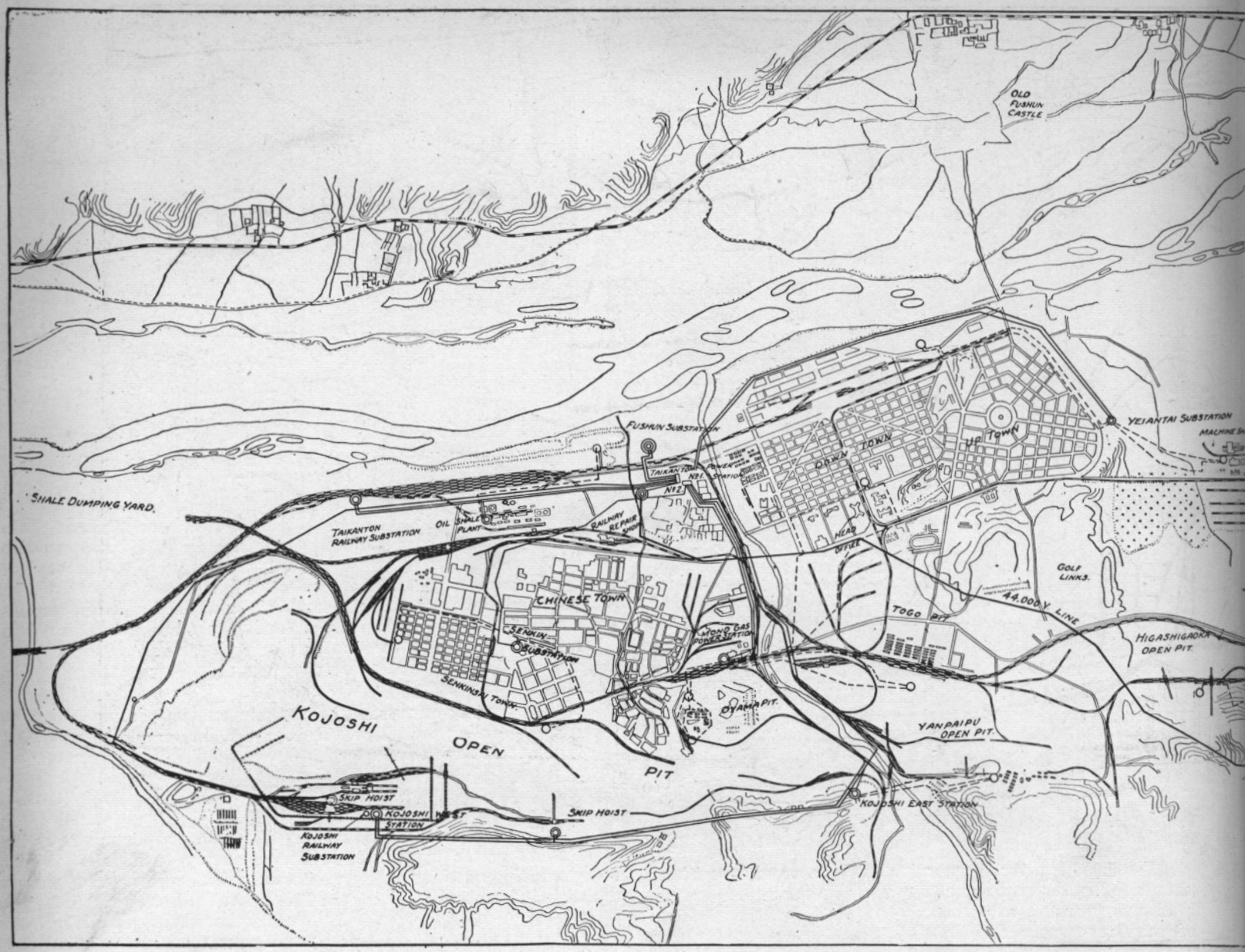
Taikanton Electric Power Station, Fushun Collieries (Cooling Tower)

No. 2 Taikanton Station

To take care of the rapidly increasing requirements of the Fushun power system, it became necessary to instal additional generating capacity. A new site was therefore selected 20 meters distant from and adjoining the Taikanton No. 1 station. In designing the plant, simplicity, ease of operation, lowest initial cost compatible with high economy, high pressure, high temperature and intensive use of equipment available, were the primary factors considered.

Including the size of the units and the early station load, a throttle pressure 25 kgr. 1 cm² gauge and 385°C was estimated to give the highest commercial economy, because the cost of coal at the station is very cheap. Stokers were chosen, as their adoption tended to eliminate certain complications. The economizers have 46 per cent as much surface as the boilers and air heaters with 170 per cent of the boiler surface reduced flue gas temperature 122°C when operating normal rating. The main turbines are at two tapping points to heat the feed water and evaporate make up water to eliminate scale trouble.

Combustion air is preheated up to 140 degrees C. and sent to the furnace through the fuel bed or introduced in small amounts



General Plan of Fushun Collieries, Showing Po

over the fire at the front of the ignition arch by two forced draft fans of the individual boiler. The Fushun stations do not require a big coal storage plant as a large amount of coal is stored at every open mine and pit mouth. This station will be completed by the end of June, 1931, but one of the 25,000 kw. generators began running at the end of November, 1930. The ultimate capacity of the plant is expected to reach 100,000 kw.

Coal Transportation.—Coal is received by 50 or 60 tons cars and tipped on track hopper. Shaking conveyors, belt conveyors, coal crusher, automatic operating skip hoists and steel belt conveyor are used between the coal hopper in the boiler room and the track hopper. This transportation system has a handling capacity of about 80 tons of coal per hour, measured and weighed on the belt conveyor.

Ash Handling Equipment.—By a combination of apron and gravity bucket conveyors, the ash is transported to a 100 tons capacity ash hopper standing at the track and loaded on the electric train made up of 40 ton air dump cars to be carried away to the dump.

Boiler House

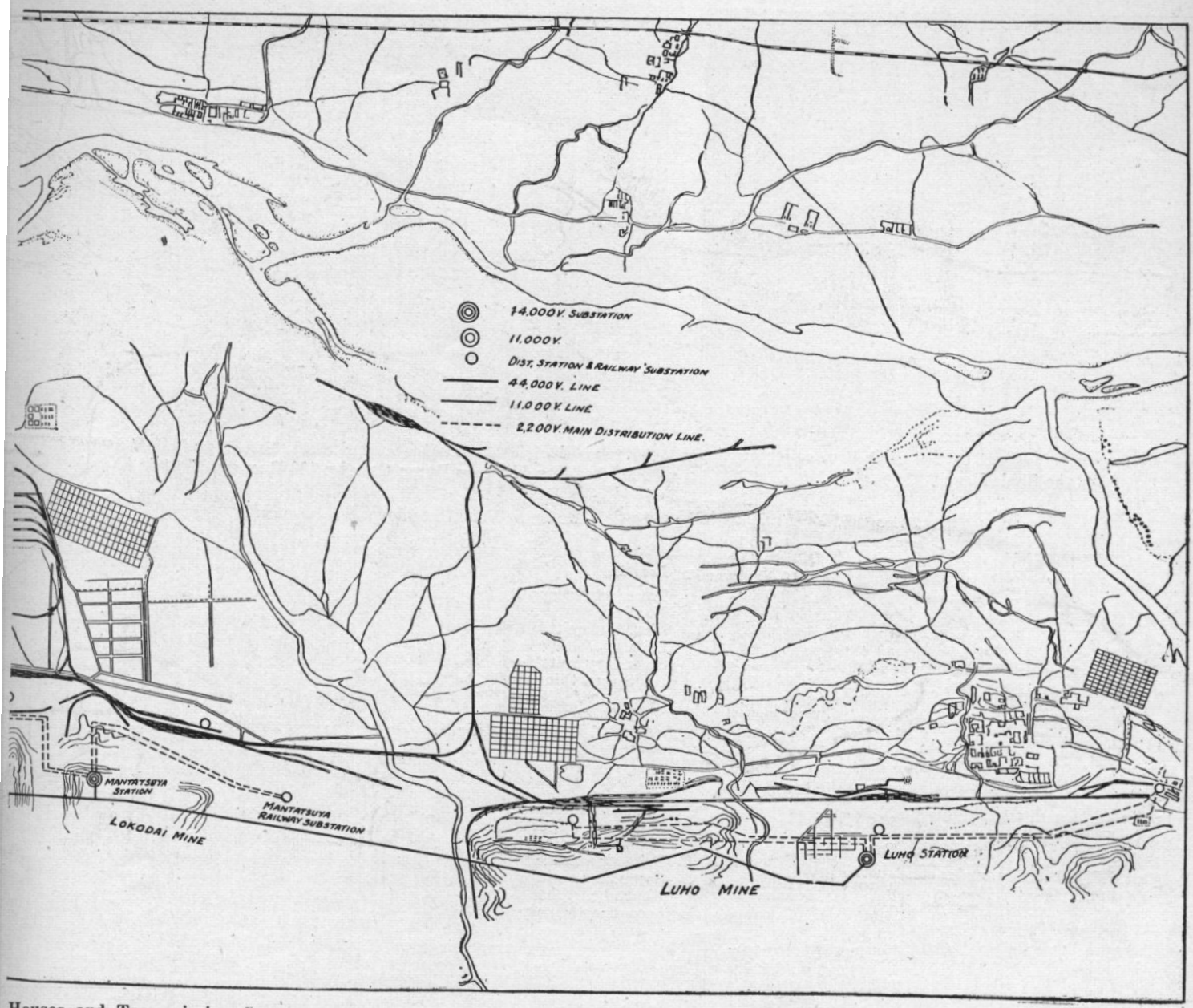
Two boilers, sufficient to generate steam for 25,000 kw. with one kept as spare are installed.

Maker	*Toyo B. & W. Co.*
Type	*C.T.M. Cross drum.*
Boiler heating surface m²	1,470
Super heater heating surface m²	410
Economizer heating surface m²	675
Air heater heating surface m²	2,500
Heating surface of furnace cooling m²	50
Maker	*Toyo B. & W. Co.*
Type	*C.T.M. Cross drum.*
Grate area (single stoker 7.62m by 7.3m) m²	55.76
Combustion gas temperature at normal rating deg. C.	
in combustion chamber	1,425
Boiler exit	330
Air heater exit	122
Feed water temperature °C	
Economizer inlet	130
Economizer outlet	178
Preheated air temperature C	
Air heater inlet	25
Air heater outlet	140
Steam pressure Kgr/cm²	
at drum	29
at superheater exit	27.5
Steam temperature C	400
Efficiency	84%
Normal evaporation Kgr/hr.	60,000
Max. evaporation	66,000

Two forced draft fans, one induced draft fan with a speed controlling device and one dust catcher are provided for each boiler. High and low water level signal, Cope's regulator, large dial steam pressure gauge load indicator,—Bailey boiler meter, draft gauge, Co ²-recorder and other necessary instruments are also pvovided.

Generator House

Maker	*Mitsubishi*
Unit capacity k.v.a.	31,560 k.v.a.
Number	2



Houses and Transmission System

Type	*Single cylinder, high efficiency.*
Steam pressure, Kgr/cm²	25
Steam temperature C	385
Vacuum %	96.7
Condenser surface m²	2,350
Circulating water quantity m³/hr.	6,750
No. of bleeding	2
R.P.M.	1,800
Generator Voltage V	11,000
Phase	3
Cycle	60
Exciter kw.	120

Steam consumption and generator efficiency at most economical load are guaranteed 3.96 Kgr. kw.h. at straight condensation and 96.6 per cent respectively. Two circulating pumps (60 per cent of normal capacity) are provided for each unit.

Heating Evaporating and Deaerating Plant.—Two evaporators; one high pressure, one low pressure heater and evaporator condenser are provided for each turbine and deaerating action is done by special design of the main condenser.

Output kw.	*Make up water Kgr/hr.*	*Final feed temp. °C*
25,000	2,750	135.5
20,000	2,130	129.5
15,000	1,630	121.4

Re-cooling Water Towers.—Two all-concrete cooling towers are sufficient to cool down the circulating water for 25,000 kw. generation in summer and one in the winter season. Compared to the spray cooling pond, it is more efficient, requiring smaller space and less make up water, but the installation cost is about 15 per cent higher.

Switching Gallery.—The switch board equipment is sectioned in three rooms, one for the controlling boards, one for the bus-bars and others for the oil circuit breakers and twelve feeders going out to the substations. On the tie line between No. 1 and No. 2 stations, to protect the oil circuit breaker explosion in No. 1 station, is inserted an 8 per cent reactance coil. The rupturing capacity of oil circuit breakers in No. 2 station is 850,000 k.v.a. The most up-to-date protection system for the generators and the feeders are used and recording instruments are provided for the principal parts. Power cable canal and lead cable canal are provided for easy inspection and installation.

Transformer Substations

Four step-down and one step-up transformer stations are operating; two step-down and one step-up transformer stations under construction will be completed in July, 1931, as shown in the map.

The standard voltage in Fushun is 44,000 and 11,000 v. for transmission lines, 6,600 v. for large capacity motors, 2,200 v. for distribution main or medium size motors and 220, 100 v. for small power or electric lighting respectively.

Fushun Step up Transformer Station

Power is transmitted to Mukden-Liaoyang-Yentai-Tieling-Kaiyuan through this station. Total length of the transmission lines is about 250 km.

85 tons Locomotive collects current by the Slide arm collector at the Shale Bench

85 tons Electric Locomotive at the Shale Bench, in Kojohi Open Pit. Loading Shale on Dump Cars by 120 Bucyrus Electric Shovel

Location	*Taikanton,*	*Fushun*
Transformer capacity (single phase)	2,000 kva.	1,000 kva.
Number	4	4
Max. transmitted kva.		10,000 kva.
Primary voltage		10,000 v.
Secondary voltage		44,000 v.
Earth protection	Petersen coil at neutral	

TAIKANTON STEP-UP TRANSFORMER STATION

(Out door substation, under construction)

Location	*Taikanton power station*
Transformer capacity (three phase)	12,000 kva.
Number	2
Primary voltage	10,000 v.
Earth protection	Petersen coil at neutral

Power supplies to eastern district in Fushun.

LUHO STEP-DOWN TRANSFORMER STATION

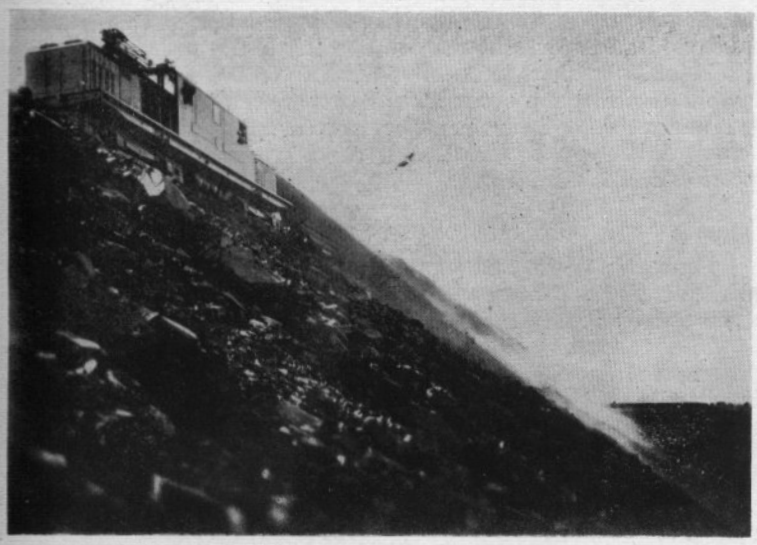
(Out door substation, under construction)

Location	*Luho mine*
Transformer capacity (three phase)	6,000 kva.
Number	2
Primary voltage	40,000 v.
Secondary voltage	2,200 v , 6,600 v.
Secondary feeders	about 6

MANTATSUYA STEP-DOWN TRANSFORMER STATION

(Out door substation, under construction)

Location	*Mantatsuya mine*
Transformer capacity (three phase)	6,000 kva.
Number	2
Primary voltage	40,000 v.
Secondary voltage	2,200 v , 6,600 v.
Secondary feeders	about 6



Dumping Shale at the Dumping Yard

KOJOSHI WEST STEP-DOWN TRANSFORMER SUBSTATION

(Indoor substation)

Location	*Kojoshi open mine*
Transformer capacity (single phase)	1,250 kva.
Number	4
Max. transmitted kva.	3,750 kva.
Primary voltage	10,000 v.
Secondary voltage	2,200 v.
Neutral earthing	No.
Secondary feeders	9

KOJOSHI EAST STEP-DOWN TRANSFORMER SUBSTATION

(Indoor substation)

Location	*Kojoshi open mine*
Transformer capacity (single phase)	1,250 kva.
Number	4
Max. transmitted kva.	3,750 kva.
Primary voltage	10,000 v.
Secondary voltage	2,200 v.
Neutral earthing	No.
Secondary feeders	6

SENKIN STEP-DOWN TRANSFORMER SUBSTATION

(Indoor substation)

Location	*Senkinsai, Fushun*
Transformer capacity (single phase)	1,250 kva.
Number	4
Max. transmitted kva.	3,750 kva.
Primary voltage	10,000 v.
Secondary voltage	2,200 v.
Neutral earthing	No.
Secondary feeders	8

YENTAI STEP-DOWN TRANSFORMER SUBSTATION

(Indoor substation)

Location	*Yentai, city water reservior, Fushun*
Transformer capacity (three phase)	1,500 kva.
Number	3
Primary voltage	10,000 v.
Secondary voltage	2,200 v.
Neutral earthing	No.
Secondary feeders	8

Power feeds to the waterworks and the machine shop

The 44,000 v., 11,000 v. transmission lines are to be protected by most up-to-date relay combination for overload, phase, short circuit or earthing phenomena and 2,200 v. circuits are also protected by ordinary induction type overload and reverse power relays.

TRANSMISSION AND DISTRIBUTION LINES

The principal transmission and distribution lines between the power houses and the substations are constructed as a duplicate line system for power supply reliability.

Surface lines are strung on wooden poles or steel towers and power cables are used for underground mines.

LENGTH OF LINES (1930)

Extra high tension lines	49 km. (not included Mukden line)
High tension lines	212 ,,
Low tension line	328 ,,
Installation h.p. of electric motors (1930) 66.826 h.p.	(only Fushun, except D.C. motor, not included other city)

ELECTRIC RAILWAY

The steam locomotives were replaced by electric locomotives in October, 1914, for the surface lines to transport coal, sand and other material as well as for passenger service. Regarding this electrification, it may be interesting to note that it is the pioneer to use high voltage, 1,200 v. D.C. in the Far East. Since then a continuous expansion of electrification has been carried on for transportation at the open pit and underground mines.

Surface Line

Coal from all pits is transported to the terminal of the S.M.R. main line. The transportation of materials for the use of stowage mining from their collecting stations to pits, as well as all other interpit freight and passenger service, are under the care of the Transportation Department. The length of track is 160 km. and existing rolling stock is as follows :—

Locomotives.

Self weight in English (ton)	*Maker*	*Number*	*Motor h.p.*	*Tractive effort at rated current kgr.*	*Speed at rate current km/hr.*
73	Shibauro	2	4 by 290	9,800	31
,,	Kawasaki	3	4 by 275	14,800	23.4
50	S. M. R.	3	4 by 125	6,560	20.8
,,	General Electric	13	4 by 125	7,200	16.2
,,	A. E. G.	4	4 by 110	7,400	17
25	S. M. R.	5	2 by 55	1,368	24
,,	A. E. G.	4	2 by 55	1,368	24

Passenger cars	*Number*	*Motor h.p.*	*Seat capacity*	*Speed at rated current*
Motor car	9	2 by 80	80	24.7
Trailer	17	—	80	—
Motor car	2	4 by 40	—	24.2

Freight cars

Number	*Construction*	*Loading capacity tons*
375	Wooden	30

The electric source of current is direct current 1,200 v. and the line construction is of single wire, five points catenary suspension, the span between poles being 45 meters at tangential track. Wooden poles are mostly used. To facilitate safety and prompt service, a color-light automatic block signal system is ued for the whole line, sectioned into about 105 parts. In 1928, 13,000,000 tons of freight and 7,000,000 passengers moved on this track.

Open Pit Line

There are three open pit workings in Fushun. The largest, called the Kojoshi Open Pit, is situated along the western terminus of the Fushun coal seam where its maximum thickness expands to 140 meters with 88 meters as an average. The coal seam is covered by brown and green shale, the former being oil bearing, which is sent to the Oil Shale Plant, for treatment. For a long time, the economic limit of depth for open mining, was believed to be 225 meters, but with the increasing efficiency of working and improved mechanization, it is year by year becoming deeper. The principal difficulties in open pit mining is the shale excavation and its transportation. Electric shovels are used for this purpose at every bench of 10 meters high. The yearly excavation of shale and alluvium is more than 6,000,000 solid cubic meters which is transported to the oil shale plant or the dumping yard about 10 km. distant. These railways on the inclines connecting with the main line, have a 1.5 per cent grade with 1 per cent on the benches. For the electrification of these heavy grade lines in the Kojoshi and Yanpaipu Open Pits, the first scheme was completed in August, 1929. More than thirty electric locomotives are in use for this service.

Each locomotive has one pantograph for the permanent way and two side-arm collectors for the shale benches or dumping yard to collect current from 1,200 v trolley wire of single catenary suspension or direct suspension constructions.

Locomotives

Weight in tons	85	55
Working place	Kojoshi Open Pit	Yanpaipu Open Pit
Trolley voltage v.	1,200	1,200
Main motor h.p.	4 by 325	4 by 150
Speed at rated current km/hr.	24	18
Tractive effort kgr.	14,800	9,100
Hauling load at level tons	5,172	4,864
Track gauge m.m.	1,435	1,435
Makers and numbers		
Shibaura S.	5	—
Hitachi S.	6	—
Mitsubishi D.S.	1	3
Siemens S.W.	4	—
Total	16	3

All locomotives were specially constructed to meet heavy duty, on difficult road beds ; 85 ton locomotives hauling nine 40 cubic yards steel air dump cars composing each train, the 55 ton locomotives haul eight 25 cubic yards steel air dump cars in one train.

Coal Transportation at Coal Bench in Open Pit

Thirteen 12 ton locomotives operate in the Kojoshi Open Pit to transport coal and dirt excavated by small electric shovels to the bottom of the big electric skip hoists. The current is D.C. 500 v. collected through side-arms, but for emergency, a cable reel with 100 meters cable is mounted on the end cab. The locomotive hauling about 20 tubs of four ton capacity compose one train, run on round trips between the hoist bottom and attacking face.

Locomotives

Number	13
Main motor h.p.	2 by 45
Speed at rated current km/hr.	12
Tractive effort kgr.	2,080
Hauling load in tons	180
Track gauge m.m.	900
Maker	*Mitsubishi D.S.*

Coal Transportation at Surface

Four 12 ton and one 5 ton locomotives are used for coal transportation between the Togo and the Tanpaipu Bits :

Locomotives

Number	4	1
Self weight in tons	12	5
Main motor h.p.	2 by 45	2 by 20
Speed at rated current km/hr.	12	10.4
Tractive effort kgr.	2,080	970
Hauling load kgr. tons	180	30
Track gauge m.m.	900	609
Maker	*Mitsubishi D.S.*	*General Electric Co.*
Working voltage v.	500	500

Coal Transportation Underground

On the main underground mine railways small locomotives hauling small coal tubs are used :

Name of Pit	*Togo*	*Lokodai*	*Oyama*
Working voltage v. (D.C.)	250	500	250
Self weight in tons	5	5	5
Number	3	2	4
Main motor h.p.	2 by 20	2 by 20	
Tractive effort kgr.	952	907	
Track gauge m.m.	609	609	609
Maker	*Siemens S.W. General Electric Co.*		*Toyo D.S.*

RAILWAY SUBSTATIONS

There are three 1,200 v-substations, three 500 v-substations and two 250 v-substations in Fushun supplying D.C. power for the railway electrification.

1,200 v. SUBSTATIONS

Name of substation *Kind of generator*	*Taikanton Mercury rectifier*	*Mondgas M-G.*	*Mantatsuya M-G.*
Unit capacity kw.	1,100	750	400
Number	4	3	3
Total available output in kw.	4,400	2,250	1,200
No. of feeders	3	3	2
Maker	*B.B.C. & Hitachi S.*	*Siemens. S.W. & General Elec. Co.*	*General Elec. Co.*

The D.C. generator main and feeders are protected by high speed circuit breakers and other necessary and up-to-date instruments and relays. Transformer connection for the mercury rectifier is double-six phase with cathod reactance and supplies current to 12-anode rectifier. Since 1926, we have not experienced any severe troubles with the rectifier and operate at a very much higher efficiency compared with M-G. sets.

500 v. Substations

Name of substation / *Kind of generator*	*Kojoshi* *Syn. Converter*	*Yanpaipu* *Syn. Converter*	*Lokodai* *M-G.*
Unit capacity kw.	400	200	50
Number	2	1	2
Total available output kw.	800	200	100
No. of feeders	3	1	2
Maker	*Fusi D.S.K.*	*Mitsubishi D.S.*	*Oerlikon*

250 v. Substations

Name of substation / *Kind of machine*	*Togo* *M-G.*	*Oyama* *M-G.*
Unit capacity kw.	100	100
Number	2	1
Total available output kw.	200	100
No. of feeders	2	2
Maker	*Shibaura S.*	*Yasukawa D.S.*

For underground electrification, we chose 250 v. D.C. as the best voltage for a small locomotive and 500 v. D.C. for a larger size locomotive.

Principal Installation of Electric Machines in Fushun Mines

The future of machine mining in Fushun presents a very interesting problem, in order to increase the amount of coal produced per head of labor up to a steady average of 7 or 8 tons per day. The output is sometimes over 20 tons, at present. In the open pit working, we have already furnished complete mechanization and reduced human labor to a minimum. The principal installation of electric machinery is as follows :—

(1) Hauling Gears

Capacity of motor h.p.	*Type of Haulage*	*Voltage v.*	*Number of sets*	*Daily output of coal in ton*
300 (one hour rating)		2,000	26	—
150 ,,	Single rope, Single drum, A.C., shipring type induction motor with speed controlling device of metallic resistance	,,	24	
75 ,,		,,	21	
50 ,,		,,	8	
1,100 (continuous rating)	Water rheostat speed controlling system, single drum, single rope	6,000	2	5,000
*1,300 (continuous rating)	Double drums, double ropes, speed controlling device same as above	6,000	3	7,500

*Now under construction.

Makers are mostly Japanese, but the 1,100 and 1,300 h.p. haulage gears are supplied by the S.S.W. and A.E.G. in Germany.

(2) Pumping sets

Motor h.p.	*Number of sets*	*Manometric head in ft.*	*Quantity of water in cub. ft.*
1,320	3	1,480	270
1,200	2	1,300	200
900	2	1,320	240
550	4	1,000	200
500	2	1,320	120
470	2	1,320	120
460	7	1,200	130
460	5	800	200
450	2	800	200

Makers are mostly Japanese.

(3) Electric shovels are supplied by the Bucyrus-Erie and the Marion Company. One of 50-B type made by the Kobe Steel Works in Japan, is giving good results. The 50-B type are used for coal mining and the bigger machines for shale excavation.

Type of shovel	*Number of sets*	*Dipper capacity cub. yard*	*Actual working rate cub. yard of shale per day by solid measure*
200-B.	2	6	2,500
120-B.	8	4	2,500
103-C.	1	4	1,500
—	1	2.5	1,000
50-B.	2	2	800

Type of shovel	*Number of sets*	*Dipper capacity cub. yd.*	*Actual working rate ton of per day*
50-B.	11	2	1,000
50-B. extra high lift	2	1.5	700

One of 200-B is now under construction. Mark " B " means a revolving type and Mark " C " a swing type.

The Hankow Light and Power Co., Ltd.

(*Continued from page 300*).

eight, the additional five all being of 3,140 sq. ft. heating surface and 10,500 lb. per hour evaporating capacity. The five large boilers have all recently been equipped with superheaters. The steam pressure is 165 lb./sq. in. and the temperature at the engine stop valve is 540/570 deg. F. The improvements carried out during the past four years in the boiler house and generating station including the installation of superheaters, feed water preheaters, additional circulating water facilities, etc. have brought about a reduction in coal consumption of approximately 65 per cent and the present boiler house efficiency is 83 per cent.

5. Distribution Net Work.—The distribution of current is effected entirely by means of overhead mains and services which are carried on steel lattice work poles, the cabling being almost entirely triple braided and stranded hard drawn copper wire of British manufacture. A large number of improvements and alterations had been carried out in the net work during the past four years involving the expenditure of quite a large amount of money but the reduction in distribution losses has been considerable. The most important improvement effected was the installation of a heavy calibre ring main encircling the French Concession and linking up the existing feeders.

6. Repairs, etc.—It is worthy of note that all maintenance and repair work in the Generating Station is carried out by our own Chinese fitters, and we venture to assert that their work compares most favorably in quality with that of English or American trained mechanics who have served their time in the use of tools in the ordinary way.

On the electrical side the Company also carries out all repairs to its own electrical machinery of all descriptions and does considerable of this sort of work for outside clients. They also test and repair all their own meters.

7. Sales Department.—A separate sales organization was created about four years ago and new showrooms were built which have since been enlarged as the business expanded. This department acts as agents for the whole of Central China for about 24 firms of manufacturers nearly all of whom are British, and they are doing a fair amount of business and show signs of expanding in the future when the currency becomes more stabilized. They also carry out a large amount of work in installations, wiring contracts, etc.

8. General Remarks.—Due to the very rapidly increasing load on the station during the last winter season it is proposed to augment the existing generating plant by the purchase of a 2,500 kw. continuous maximum rating self-contained turbo generator set driving a shunt wound generator through speed reduction gears, and at the present time tenders are being considered from two British firms of manufacturers of this type of turbine. It is not proposed, however, to increase the steam pressure by the purchase of new boilers, but merely to raise the temperature by the installation of an independently fired superheater.

ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW

DEPARTMENT OF COMMERCE
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遠東時報

HOOVER IN CHINA
NANKING THROWS A BOOMERANG
ADVENTURES IN AMERICAN JOURNALISM
OUR SANCTUARY
CANTON—A WORLD PORT
BUILDING A NEW SHANGHAI
ASIATIC MARINE SUPPLEMENT

Vol. XXVII | JUNE, 1931 | No. 6

The Far Eastern Review

ENGINEERING FINANCE COMMERCE

VOL. XXVII SHANGHAI, JUNE, 1931 No. 6

Hoover Doesn't Have to Explain

The Kaiping Mining Deal Revived

As 1932 draws nigh, the Grand Old American Knocker is starting to knock. The campaign of slander, inuendo and calumny that precedes a national political convention is well under way. In anticipation of President Hoover's renomination, we are being regaled with a rehash of the story of his connection with the old Kaiping Mining Deal. One of the most biased and incomplete reports of this spectacular transaction that has been offered to the public under the guise of impartiality, has recently appeared in the form of a book entitled "*The Great Mistake*" by John Knox. The cover of the book, asks the question. "*Can Herbert Hoover Explain His Past.*" The writer claims there is a growing discontent with the executive performance of Mr. Hoover and that a notable feature of this discontent is the rising tide of the disparaging stories which are told about the President, strange cracklings of gossip and accusation which run along the grapevine telegraph which spreads its network into every corner of American life. It is a great mistake says Mr. Knox to let these stories go unchallenged or unproven, and Mr. Hoover and his friends owe the public a complete and convincing refutation or explanation of the stories that are told about him.

Mr. Knox devotes much of his book to Mr. Hoover's part in the Kaiping Mining deal of 1900, taking his facts largely from the newspaper reports of the case brought by Chang Yen-mao in 1905 against Mr. Morcing and the Chinese Engineering and Mining Company, Ltd., for recovery of Chinese administrative control of the Kaiping properties. We agree in that the abridged British newspaper reports of that trial leaves the reader with a feeling that Mr. Hoover's employers were guilty of sharp practice. In fact, Mr. Justice Joyce of the Chancery Division of the High Court of Justice, who heard the case and delivered judgment, closed his decision with the following words:

....."*in the investigation taken before me of the transaction in question, it has not been shown to me that his Excellency Chang has been guilty of any breach of faith or of any impropriety at all, which is more than I can say for some of the other parties concerned.*"

The full story of the Kaiping Mining transaction was never brought out at the above trial, which had nothing to do with the legality of the original transfer of the property or of the financial end of the deal which converted a Chinese official enterprise into a British share company during a time of war. The whole Chinese case revolved around the validity of a subsequent Memorandum of Transfer which stipulated that the management of the company was to be conducted by two boards, one in China and one in London, and that Chang Yen-mao would hold the position of Director-General in supreme control of affairs. All the Chinese wanted after the debts of the old company were paid and new capital raised for carrying on operations, was full administrative control with the powers to put into practice the old system of squeeze which diverted the profits into their own pockets. No more, no less.

The collective indictment of the defendants by the British judge may have been justified by the evidence brought forth at the trial, but in view of all that is now known of both sides of the controversy, it seems unduly harsh and uncalled for. His reflection on the good faith of the defendants is remembered when the rest of his lengthy and highly technical decision is forgotten. The Chinese asked for justice in a British Court and they got it—on paper. The effect of Justice Joyce's decision was to give the plaintiffs rescission of a contract which could not be rescinded except upon terms which the plaintiff was not willing to accede to. The court gave the plaintiff the right to enter a claim for what damages he had suffered by the company breaking the agreement, and the Supreme Court of Judicature on an appeal of the case, upheld the lower court, but stayed all further proceedings!

In other words, Chang Yen-mao established before the British courts the validity of the memorandum giving him full control over the properties as Director-General in China for life, but as this memorandum violated the British Companies' Law which provides that all British Companies must be directed by a board elected by the shareholders in England, it could not be enforced. In his ignorance of British law, Chang or his attorney made the mistake of signing a deed of sale in July 1900, without qualification and when, after the formation of the company in England and the raising of new capital, he stipulated the conditions of transfer, they could not be legally carried into effect. Chang was left with a claim for damage which was finally paid in full in 1912 on the amalgamation of the old Chinese Engineering and Mining Co., with the Lanchow Mining Company and their organization into the present Kailan Mining Administration. From the legal point of view the old controversy terminated harmoniously with the new deal. The slate was wiped clean.

It is difficult to reconstruct the case at this late date, when the leading participants in the transaction have passed away. Only the juniors remain, and amongst them is Herbert Hoover, the 24 year old mining expert who at that period was struggling to hold a good position and keep the good will of his employers. At no stage of the deal was Mr. Hoover a principal. He acted as an agent, a stakeholder, into whose hands was entrusted the original deed of sale, which transferred the Chinese Government Kaiping Mines to British ownership in order to save the properties from being confiscated by the Russians as spoils of war. At the time the deed was signed (July 1900) Russian troops occupied the mines and the railway. They even grabbed a concession at Tientsin in order to cut off the British concession from the railway station, and there was every evidence that they intended to annex the whole of North China.

The story of the Kaiping Mining Deal was told in the November 1928, issue of *The Far Eastern Review*. Mr. Knox calls upon President Hoover or his friends to explain his part in this transaction. Mr. Hoover's part stands out clearly without need of explanation. There is not a man alive to-day who can tell the real story of all that went on behind the scenes in 1900. It is, however, known that the deal was part of a complicated international intrigue of the early part of the century, a play for empire, for power and the spoliation of China by secret forces whose existence was recognized only by the inner-most circles of European diplomacy. To try and connect an inexperienced 24 year old American mining engineer, two years out of a California college, with these plots is to say the least, fantastic. Even our own State Department was maintained in sublime ignorance of what was

going on. All through Mr. Knox's book he calls upon Mr. Hoover for a frank disclosure of facts, which need no explanation. Mr. Knox simply opened up the files of *The Times* of 1905, and copied the reports of the trial as therein set forth and let it go at that.

Mr. Knox does not distinguish between the original deed of sale handed to Mr. Hoover in July 1900 and the Memorandum of Transfer of February 1901, drawn up after the Company had been registered in England, and a bond issue floated to pay old debts and to provide working capital. The validity of the initial deed of sale was never questioned. It was not secured by "main force." If any force was employed, it obviously came from the Chinese anxious to protect their properties by deeding them over to foreigners.

Mr. Hoover was not the only American handed a deed of sale for important Chinese properties in North China at that time. Mr. Charles Denby, subsequently American Consul-General at Shanghai and Vienna, resided in Tientsin during the Boxer Year and without consulting the records, we recall that the Chinese deeded over to him the China Merchants' Steam Navigation Company's properties, the Imperial Bank of China and other valuable holdings in order to save them from confiscation. To suggest that the young American engineer secured by "main force" something that the Chinese would gladly have rewarded him for taking off their hands, indicates how little Mr. Knox understands his subject and how unfair he has been to the Chief Executive of the Nation.

Mr. Knox's woeful ignorance of things Chinese is also revealed in the following passage in his book;

> "In the testimony of this and the previous days, one condition seems to be more or less clearly established--that Mr. Hoover went to China as a salaried employee of Chang and that while receiving that salary he carried on correspondence with Moreing which was eventually greatly to the disadvantage of Chang. There is a strong suggestion that Mr. Hoover was guilty of biting the hand that fed him."

Rot! Chang used Moreing to raise funds for him in Europe secured on the Kaiping Mines. Moreing placed a £200,000 bond issue on the London market at 12 per cent, subscribing to half the amount himself. Moreing was therefore personally interested in the mines. Chang then requested Moreing to send him an expert mining engineer and Moreing took Hoover from Australia and ordered him to China. Hoover was nominally a paid employee of the Chinese Government, but he also held the representation of Bewick, Moreing & Co., and as we recall, had an office in Tientsin under that name. Nothing wrong about that. We could cite many other instances in China, where advisers and experts employed by the Chinese Government were loaned by foreign firms or governments and drew salaries from both sides. Anyhow, there is nothing to indicate that Mr. Hoover betrayed Chang's trust in retaining a connection with his old employers. As a matter of fact, before he could accept the deed of sale to the Kaiping Mines entrusted to him in the name of Bewick, Moreing & Co., he had to telegraph to London for authority to act for them in this matter.

The real facts worth while considering in any controversy over this old transaction are revealed in a study of the financial conditions of the semi-official Chinese enterprise and the new British company. The old Chinese Engineering and Mining Company, capitalized at Taels. 1,500,000 (G.$1,125,000) never paid more than a nine per cent dividend, say G.$100,000. The debts and obligations of the old Company taken over by the new, approximated £600,000. These debts had to be paid and working capital raised to enable the new company to proceed with the operation of the mines and the construction of the harbor at Chingwangtao.

When Hoover assumed charge as Chief Engineer the new Company was capitalized at G.$5,000,000 with a bonded indebtedness of G.$2,500,000, and during the first year he showed a profit of G.$525,000 and $650,000 the second year. In other words, it was conclusively proven that for years the Chinese officials plundered the company of the difference between G.$600,000 and G.$100,000, the money going to the viceroy to pay the expenses of the Peiyang fleet and to propitiate the Throne.

The old Chinese company, was not only facing bankruptcy and foreclosure by its creditors, but the Russian forces had seized the properties and announced their intention to confiscate them as spoils of war. This was the situation when the Chinese deeded over the properties to Bewick, Moreing & Co., in July 1900 in the hope that its immediate registration as a British company would save it from Russia.

The Kaiping concession, since merged with the Lanchow mines and now known as the Kailan Mining Administration stands to-day as a monument to honest direction, a tribute to the executive skill of the young American mining engineer who eliminated graft and corruption at the outset and transformed a bankrupt property into one of the most profitable mining enterprises in the world. Let that fact stand to his credit.

There are many obscure points connected with the old Kaiping deal that could be clarified, but Herbert Hoover is certainly not called upon to explain what he knew nothing about. His part in the transaction as stake holder, intermediary or agent, is clear and above criticism. His British employers and their Belgian associates, confronted with a peculiar obstacle to the formation of a British company arising from the pledges of the British Foreign Office to support its official group in these regions, had to resort to rather devious methods in order to attain their ends. They pitted their wits against a group of Chinese just as sharp and won out. Chinese officials may have lost control of the properties and the handling of the large juicy profits that they formerly diverted into their own pockets, but the nation as a whole has benefitted.—G.B.R.

Henry W. Kinney's New Book

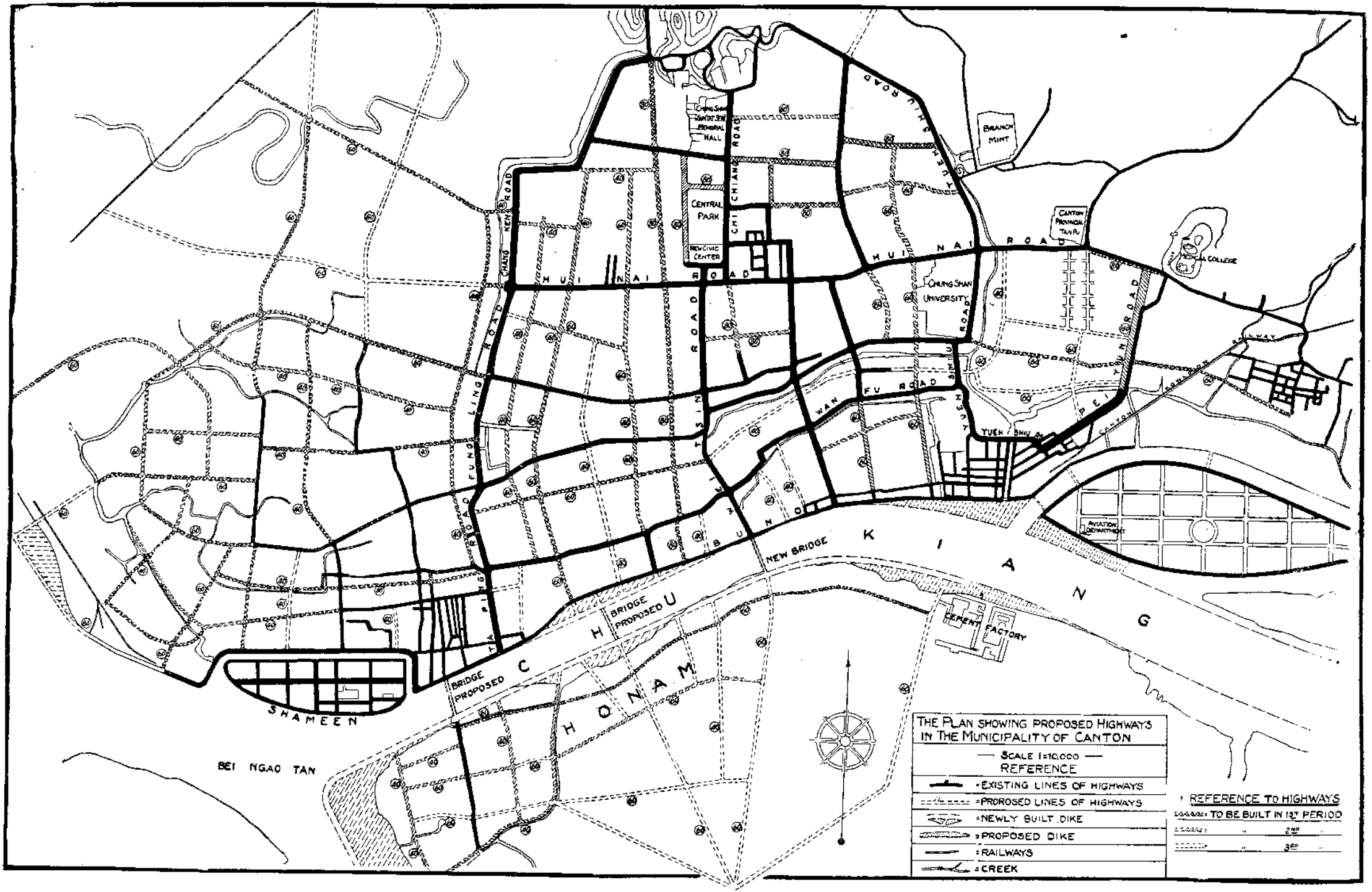
Mr. Henry W. Kinney of Dairen has brought out another interesting book on Manchuria under the title "Manchuria To-day." This volume, like those that have preceded it, is designed to present briefly the principal features of the economic situation in Manchuria with special reference to the activities and aims of the South Manchuria Railway Company.

In the opening chapter of "Manchuria To-day" is given a resumé of the outstanding events of recent years under the subheadings, "The New Régime"—"Sino-Soviet Relations"—"Partisans, Communists and Bandits"—"Japanese Policies and Interests"—"Chinese Build Railways"—"Motives for Construction"—"Port at Hulutao"—"Extension of Influence"—"Other Chinese Activities" and "Future Prospects." The remainder of the text largely is the same at that contained in Mr. Kinney's "Modern Manchuria," which was published in 1929, but this portion has been thoroughly revised, particularly in the matter of statistical information. The new book is most profusely illustrated and most of these illustrations are new.

As Mr. Kinney sets forth in a foreword, the South Manchurian Railway Company as a semi-government institution is one of the main factors in the advancement of Japan's aims and policies in Manchuria and the writer again emphasizes that these aims and policies are not colonization or political control, but the development of the abundant resources of this rich, hitherto only partly settled territory, and its consequent increase in population and purchasing power.

The writer explains how the South Manchuria Railway is much more than a transportation system operating for profit, for besides providing Manchuria with a highly efficient railway and assisting the Chinese to build railways of their own, the activities of the Company include numerous functions contributing materially to increase agricultural and industrial production and commerce besides spending immense sums on education, hospitals, sanitation and other enterprises for the benefit of the population generally, from which no financial returns are expected.

The new volume, which includes an excellent map in color, is in brown and gold cloth of handy size and attains a high degree of excellence typographically.


BRANCH MINT
CHUNG SHAN MEMORIAL HALL
CENTRAL PARK
NEW CIVIC CENTER
CANTON PROVINCIAL TAN PU
MEDICAL COLLEGE
CHUNG SHAN UNIVERSITY
AVIATION DEPARTMENT
CEMENT FACTORY
NEW BRIDGE
BRIDGE PROPOSED
SHAMEEN
BEI NGAO TAN
CHI CHIANG ROAD
HUI NAI ROAD
CHUNG KEN ROAD
FUNG LING ROAD
TSIN HUN ROAD
WAN FU ROAD
PEI TUN ROAD
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THE PLAN SHOWING PROPOSED HIGHWAYS IN THE MUNICIPALITY OF CANTON
SCALE 1=10,000
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THE FAR EASTERN REVIEW

上海黃浦灘念四號

遠東時報

A Possible Solution for China's Problem

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ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW

上海黃浦灘念四號

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THE MENACE IN MANCHURIA

Vol. XXVII AUGUST, 1931 No. 8

JAPANESE SHIPPING.—The accounts of Nippon Yusen Kaisha (Japan Mail Steamship Company) for the half-year ended 31st March show a loss of 644,068 yen, compared with a net profit of 412,663 yen for the corresponding period to March 31, 1930. The loss is struck after providing 4,540,504 yen for depreciation of the fleet and buildings, 1,127,026 yen for ships' structural repair fund, and 70,681 yen for insurance fund. After crediting 1,183,437 yen brought in a sum of 539,368 yen is carried forward. For the corresponding half-year a dividend at the rate of 5 per cent. per annum was paid. The balance-sheet shows the reduced book value of the fleet at 118,125,477 yen, as against 91,198,346 yen. As announced in *The Financial Times* of April 7, a ten-year agreement between the company and the Osaka Slosen Kaisha has been concluded. Together the companies control more than 260 steamers.

CHINESE SHIPPING AGREEMENT.—A report on the trade situation at Shanghai, published by the Department of Overseas Trade, states that, with a view to the limitation of competition, the six leading companies operating steamship services on the Yangtse river (two British, one Japanese, and three Chinese) have concluded an agreement for the enforcement of uniform freight rates and the discontinuance of the system of secret rate-cutting. It is understood that arrangements for the pooling and *pro rata* distribution of freights are also under consideration. As the first result of this agreement, freight schedules have been increased by 15 per cent. and are to remain in force for one year.

RUSSIAN TIME-CHARTER TERMS.—The British Trade Journal and Export World reports that while shipbuilders are not opposed to the proposals to extend Government credits to Soviet Russia for the building in this country of more shipping, shipowners, in view of the huge supplies of idle tonnage and the lowness of freights, are naturally firmly against such a scheme. The Baltic and International Maritime Conference, whose headquarters are at Copenhagen, states that it has made representations to the British Government against the grant of such credit facilities, and that these representations were based on a resolution passed at a meeting of the directors recently held in Brussels. The Conference writes that in other countries Governments and other parties are watching developments in Great Britain, and that the granting of the facilities desired, or even a favourable sign to that effect, would be taken as a signal for other countries whose shipbuilding is in a like depressed condition to embark on similar schemes.

SOVIET SPEEDS BUILDING.—A Soviet Government commission has arrived in Copenhagen to investigate the possibility of purchasing fast and up-to-date vessels for one of the most important phases of the Five Years' Plan. The commission consists of V. J. Soff, Commissar for the Soviet Mercantile Marine; M. Logonofski, representing the Department of Foreign Trade; and M. Solakoff, president of an import company, together with commercial and marine experts. Russian shipyards are now working to their utmost capacity in the construction of new vessels, but the Five Years' Plan demands at greater output still, it is stated. All the principal Danish yards are to be visited. Only large, fast and wholly up-to-date craft will be considered, and motor ships will be chosen in preference to other types. A large number of Diesel engines are also to be purchased. These will be installed in the ships now nearing completion in the Russian yards.

AVIATION

NANKING BUYS PLANES.—A squad of six pursuit planes recently ordered from Germany by the Aviation Administration of the Ministry of War flew to the Capital from Shanghai where they had been assembled. It is understood that the machines will be despatched to the front to participate in the bandit-suppression campaign in Kiangsi.

JAPAN'S NEW AIRPORT.—The newly-constructed international airport at Haneda, on the outskirts of Tokyo, which is to be opened in August, it is claimed is the largest and best of its kind in the Orient. It extends over 130 acres and is equipped, among other things, with a post office and a branch of the Central Meteorological Observatory. The airport will be placed at the disposal of foreign aviators instead of Tachikawa aerodrome, which will in future be retained as a military airfield.

NEW SOVIET AIR LINE.—The United Civil Aviation Industry has decided to open the Moscow—Irkutsk—Vladivostok air-line this August. The line, which will be about 10,000 kilometers in length, will be the longest in the Soviet Union and one of the longest in the world.

NEW AIR ROUTES.—It is learned at the Nanking Ministry of Communications that preparations are being made by the China National Aviation Corporation to operate in the near future air services linking up the North-western provinces with other parts of the country. Plans and charts for a Ninghsia-Hankow and a Lanchow-Harbin air mail and passenger service have been submitted to the Executive Yuan and approved. The Corporation has been instructed to dispatch deputies to make surveys of the air routes to be traversed by the two air lines proposed.—*Kuo Min.*

JAPAN HAS 623 WAR PLANES.—The Japanese War Office has published figures on the nation's military strength which will be submitted to the League of Nations in connection with the 1932 disarmament conference. These figures showed the army numbered 231,600 men, including officers, in addition to 2,210 men in the gendarmerie and about 20,000 police in Korea, Formosa and Manchuria. The aviation branch totaled 623 airplanes and eight regiments. It was intimated these figures would be increased.

CHINA BUYS GERMAN PLANES.—In order to train competent aviators for military purposes, the Nanking Aviation Department of the Ministry of War has ordered 20 pursuit airplanes from the German Junkers Company. Each of the planes is said to cost G.$25,000. According to arrangements made, shipments will begin from the latter part of this month. It is understood that every ocean liner which arrives at Shanghai from Germany after July 20 will have a shipment on board. Training of the aviation students under a German instructor will commence as soon as machines reach the Capital.—*Kuo Min.*

OPENS NEW SERVICE.—Passenger service between Shanghai and Manchuli and intermediate points was being planned to open August 1 with the Eurasia airplanes. The table of fares is as follows: Shanghai to Nanking, $50; Shanghai to Tsinan, $165; Shanghai to Peiping, $250; Shanghai to Linsi, $400; Shanghai to Manchuli, $515. It is reported that the missing Eurasia Plane No. 2 recently detained in Outer Mongolia has been located. One of the two captured German pilots was wounded and is now undergoing treatment in a Mongolian hospital; the other is still under detention, the report states.—*Kuo Min.*

RAILWAYS

TO PLACE BIG ORDER.—With increasing traffic on the Shenyang-Hailun Railway, in Manchuria, a large order for railway rolling-stock will be placed shortly to cope with the heavy requirements for goods and passenger accommodation. A total of 50 freight coaches, 30 baggage and sleeping cars, and four locomotives for passenger trains will be ordered. Negotiations have been under way with the Japanese South Manchurian Railway workshop for this equipment, the total value of which exceeds three million dollars, but the order has not yet been definitely placed. Bids are now likely to be called from manufacturers of other countries.

RAILWAY MATERIAL FOR CHINA.—The Purchasing Commission appointed to carry out the agreement between the British and Chinese Governments for the disposal of the British share of the China Indemnity of 1901 has opened offices at 21 Tothill Street, Westminster, with Dr. Ching Chun Wang as director. £3,500,000 is to be used for purchasing materials in Great Britain and Northern Ireland. The work of the Commission will be to execute orders from China. The first order has been received. This is for railway materials of various kinds, ranging from shovels to locomotives, to the value of about £300,000.

RAILWAY RECEIPTS.—Shenyang, August 9.—The gross receipts of the various railways in the North-eastern provinces for the month of July total $3,200,000, the North-eastern Communications Committee announces. The Peiping-Liaoning Railway alone showed a revenue of $1,500,000.—*Kuo Min.*

LOCOMOTIVES FOR SOVIET.—The Soviet Trade Delegation in Great Britain placed an order on May 27 with Messrs. Marshall & Sons, Ltd. for 175 portable locomotives for the lumber industry. The value of the order is about 100,000 pounds sterling ($500,000) and extended credit terms are being provided for. The entire order is scheduled to be completed and delivered by next September. An engineer of the British firm is to go to the U.S.S.R. for a period of a year to assist in the work of the erection and operation of these machines.

RAILLESS CARS IN TOKYO.—The Tokyo Municipal Electrical Bureau has decided to proceed with its scheme for the operation of a railless-car service in Tokyo. Six cars will be employed initially and if the results are satisfactory this number will be increased. The Susuki route is to be equipped first and a service is expected to be put into operation in the course of the current fiscal year.

NEW TRANS-SIBERIAN RAILWAY.—It is expected that plans for the so-called Great Northern Route will be pushed in a fairly near future. The great Northern Route would be a railroad connecting Leningrad with Eastern Siberia, but following a more northern course than the existing Trans-Siberian Railroad. Advocates of the project argue that as Siberia develops it will need another long-distance railroad and that the Great Northern Route would open up a region rich in lumber, minerals and furs.

BUYS RAILWAY EQUIPMENT.—British railway material to the value of £3,500,000 for the use of China's railways, is being bought by the purchasing committee in London, to whom the money, the proceeds of Britain's share of the Boxer Indemnity Fund, has been handed over in accordance with a recent agreement, cables *Reuter's* Nanking correspondent. The announcement was made by Mr. C. T. Wang, the Foreign Minister, in the course of a statement to the Press.

ELECTRIC RAILWAY EXTENSIONS.—The Johu Electric Railway has applied for sanction to start work on the extension of its electric railway system for a distance of 16 km between Musashi-Kuki and Mukosakai. It is expected that the work will be completed by June, 1932. The extension of the Numobiki Electric Railway in Nagano Prefecture for a distance of five miles is also to be carried out shortly, at a cost of over a million yen.

MINING

GOLD DEPOSITS.—A report that rich gold mines have been found in Jehol and Heilungkiang has been received at the Nanking Ministry of Industry from Mr. Wang Cheng-fu, Head of the Mining Department of the Ministry, who has been inspecting mining conditions in the North-east.

ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW

上海黃浦灘念四號

遠東時報

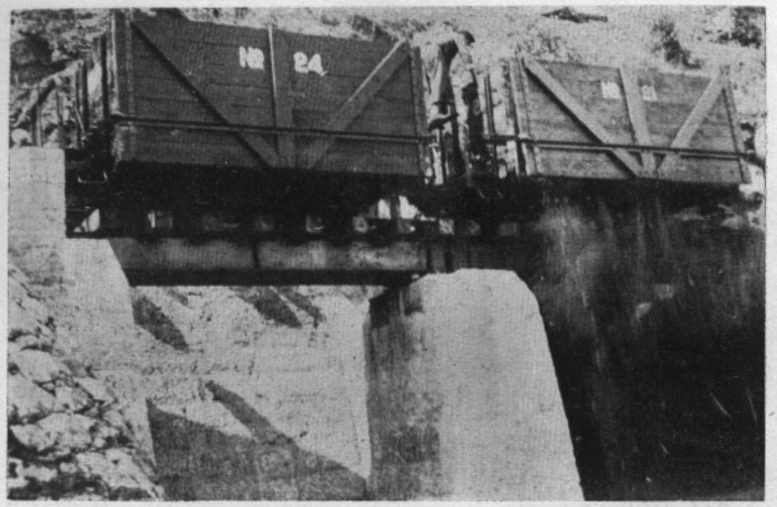
THE BULL IN THE CHINA SHOP

THE END OF EXTRATERRITORIALITY IN CHINA?

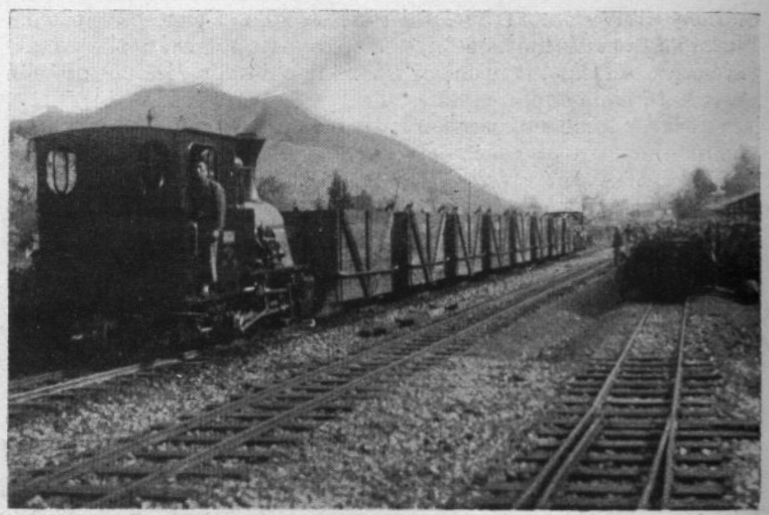
CHINA AND JAPAN

THE "PRESIDENT HOOVER"

Vol. XXVII | SEPTEMBER, 1931 | No. 9



Coal Cars on Way Back to Mines



A pretty good Job

The Only Railway in Szechuen

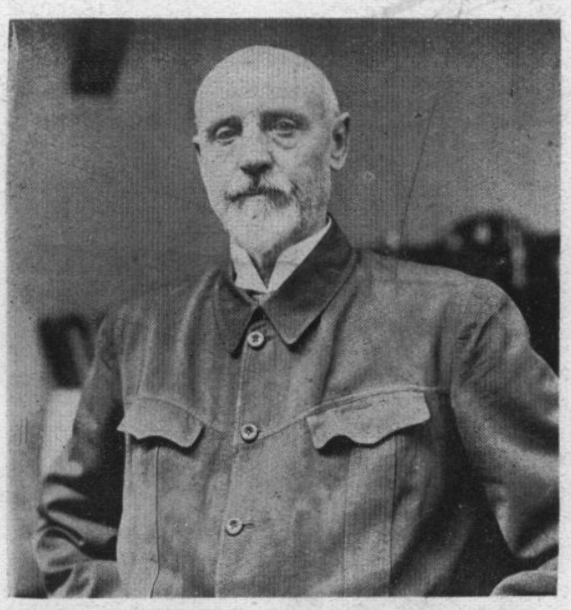
By HAROLD R. ISAACS

FOR nearly two years the only railroad west of Hankow has been puffing daily along its thirty li of rails not far from Chungking. Its existence is known to few and unsuspected by most—but there it goes tooting through country trod in the dreams of many an optimistic rail surveyor but otherwise still untouched by the engineer. Ten miles of two-foot rails are all to be found in the province that twenty years ago buzzed with plans for rail links connecting Burma and Tibet to Szechuen, which is still buzzing with the memory of the famous Cheng-tu-Hankow fiasco, where talk of ambitious railroad projects is still heard.

There are four toy engines pulling little toy cars from coal mines developed in a vast field on a miniature scale. But because it is the only such in all the vast miles from Mongolia to the Himalayas and from Hankow to Tatsenlu and endlessly beyond, its story seems worth telling, especially since no full account of its existence ever seems to have found its way into print.

Fathers and beneficiaries of the project are a doggedly persistent group of Chinese interested in mining coal. Builder and chief reason for its success is Herr Jesper Shultz, 66-year old Danish engineer whose shining white beard and bright bald pate still glow with the enthusiasm of a young engineer on his first job. Shultz is still on the ground surveying the proposed route of the line's extension.

The existence of the Peh Chuang railway is part of the history of coal mining in the Kiang Peh district of Szechuen, whose boundaries carve a considerable slice out of the eastern portion of the province bounded on the west by the Kialing Ho and on the south by the Yangtze River. Sailing up the Kailing from Chungking 60 miles or 120 li to a point just below Pei-Pei through country where automobiles are still unknown and the river motorboats are still curiosities, one is likely to hear the unexpected blast of a locomotive siren, to see curling around the top of a hill the utterly incongruous sight of a tiny train weaving like an insignificant caterpillar to the summit. It has been there less than two years but its history goes back more than thirty.



Jesper Shultz, 66-year old Danish Engineer, builder of the Railway

Shultz and his associates on the day the railroad began operation in October, 1929. The engine is one of the original British engines brought out thirty years ago—and now in use

At about this point but sixty miles north-east of the river bank a peak known as the Hwa-ying-shan noses up from the ground forming the keystone of two low but long ranges which extend from it in relatively parallel lines, known as the Eastern and Western Ranges respectively, both bisected by the Kialing. On the eastern range, nearer the Yangtze but only forty li from the Kialing riverport of Shih-chi-ku, is the Lung Wang Tung mine, source from time immemorial of coal used by the local natives.

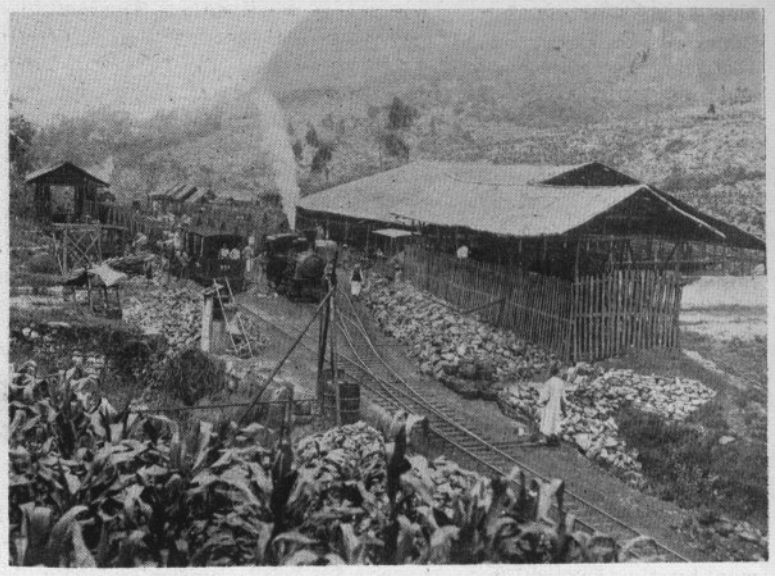
In 1897 two Englishmen arrived in Szechuen and presented the local governor with a writ from the Imperial Government at Peking giving them the privilege of mining coal and opening new developments in both ranges emanating from the Hwa-ying-shan for a distance of 200 li from the town of Kiang Peh to Ho Twanhsien. They formed into the Hwa Yin Mining Company for that purpose.

The writ they possessed contained one condition: that they could not take over without purchase any mines then

already being operated by local natives. They purchased the Lu Wang Tung, spent most of the next four years surveying the ground for a railroad from the mine down to Shih-chi-ku, a distance of 40 li.

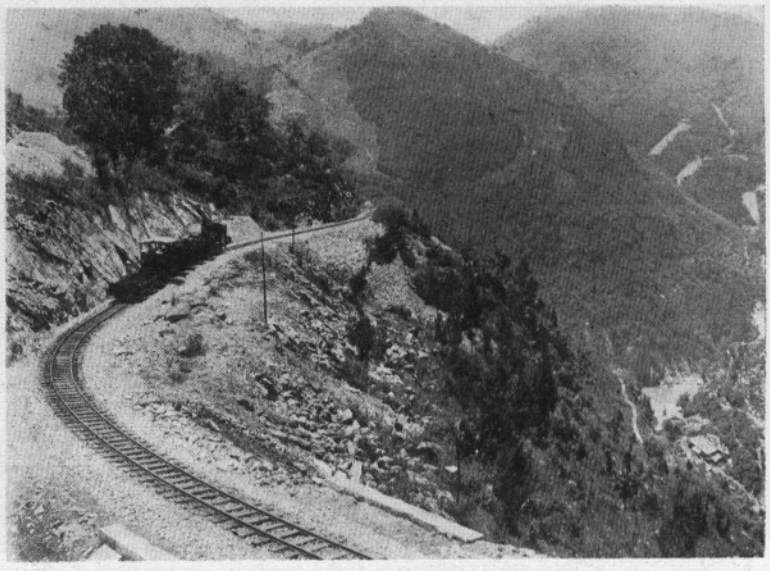
Meanwhile two locomotives, 40 li of 20 lb. rails of 24-in. gauge, iron sleepers and repair equipment were brought out from England and after endless months were brought up in junks from Ichang and deposited on the foreshore at Shih-chi-ku. The purchase value of the equipment is unknown but is estimated to have been Tls. 25,000. A godown was built to house the material and preparations were soon underway for initiating construction.

Along the grade. Note the stone bridge

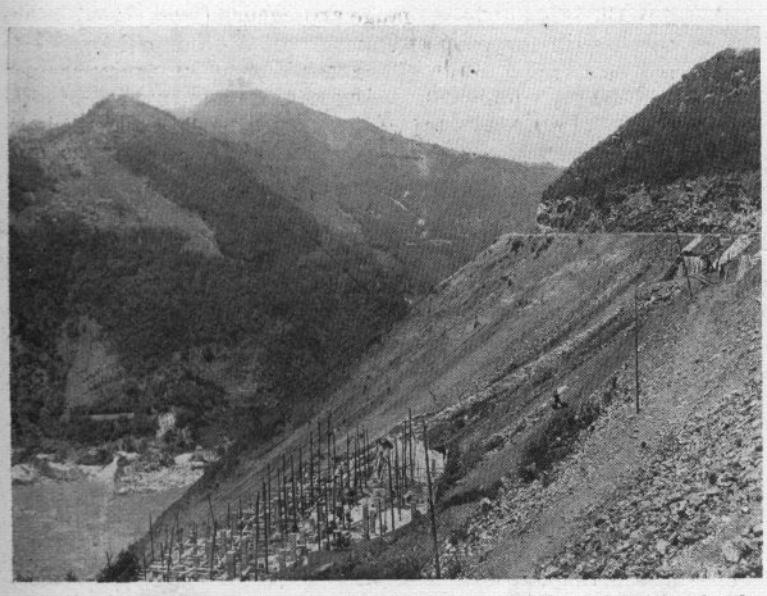


At Wen-shin-tang, changing engines in the valley for the climb

Climbing around the hill to Bei-Miao



Some idea of the upgrade pull, approaching Bei-Miao, 900 meters above river level. Buildings below mark shipping point for coal



Chute under construction at Bei-Miao for dropping coal to riverbank

On the upgrade

But the smooth progress of affairs was at an end. The Englishmen hit a snag in the shrewd opposition of certain local officials who adopted unassailable tactics to block them. They merely set the natives to work in as many places as possible breaking into coal seams and starting mines. Technically, the Peking government writ forbade encroachment on native coal preserves and the Englishmen soon found themselves hemmed in on all sides. The commissioner of the area, then known as the Twantung Tao (Eastern District), was a man named Chou Shiao-mei. By treading softly and deviously around official sanctions he soon gained his end and eventually the Englishmen had to give up the ship.

Lengthy representations were made at Peking and a protracted controversy carried on. A settlement was finally reached and approved by the Imperial Government whereby the Englishmen were to be compensated for the surrender of all their rights and equipment by the payment of Tls. 300,000. The money was soon raised by a special tax in the tao and the Englishmen left Szechuen in 1901 to return, presumably, to England, minus considerable energy but none the worse off financially.

For the next twenty-eight years the railroad never left the gloomy shadows of godowns, first at Shih-chi-ku, and much later in Kiang Peh. The Peh Chuang railway, conceived but unborn, suffered in silence through an inordinately long prenatal period. Meanwhile the group that was eventually to save the womb from becoming a tomb was introduced into the coal situation.

Shortly after the Englishmen left in 1901, a number of Chinese formed the Kiang Ho Coal Mining Company and bought the rights won by the English from the Szechuen Provincial Government for Tls. 70,000, which included all the railway equipment. Thus their original capital of Tls 100,000 was cut to Tls. 30,000 and with this money operations were begun at the Lu Wang Tung. The coal proved to be of excellent semi-bituminous quality but only little could be done to increase the output. The market was still confined to local users.

During the next nine years coal was mined (as it is still being mined) in a fashion changed but little from the usages of centuries. Carrying coolies were able to make one trip daily over the 40 li down to the Kialing where the coal was loaded on junks and carried to cities below. Then 1911—the half-strangled birth of a new world in China.

After that steamers operating on the upper river became more numerous and it was soon found that the coal was an excellent fuel for boiler use. There were some years of grace during which coal was taken out in greater quantities and distributed to steamers at Chungking, Wanhsien and Ichang. But by 1919 a long series of troubles with briefly-reigning military men began.

General Lu Sz-ti and his able cohorts trumped up a long term tax charge against the company, arrested its managers, confiscated all papers and occupied the mine. Mined coal to the value of Tls. 100,000, a fine of an additional Tls. 100,000, with interest compounded to a total of nearly 100% brought the subsequent losses to nearly Tls. 300,000. When the cash was paid in the officers of the company were released from jail but the mine remained in the hands of the military under whose auspices the price shot up to $12 a ton from a previous level of $4. During the hectic years that followed the mine fell into the lap of one warlord after another.

Repeated attempts on the part of the Kiang Ho officials to recover the mine finally succeeded in 1926 when it was "returned" to them by General Liu Hsiang, then enjoying one of his several reigns at Chungking and now enjoying his longest. Shares totalling $40,000 were given the military, in addition to $30,000 for alleged investments made by them. An identical settlement was made with the men who had been operating on behalf of the military and the Kiang Ho people finally recovered possession of their property after an allotment of $140,000 in shares to those from whom it was being recovered. The firm was reorganized into the Shieh-chi Kiang Ho Mining Company and operations resumed. By that time other firms were in the field, costs had risen and things did not ride too smoothly. Attention was turned meanwhile to another field.

When the Kiang Ho Company took over the original rights in 1901 they also began operations in mines along the Western Range where a different quality of coal was available. While the Lu Wang Tung was situated in sandstone, with an 18 inch seam of comparatively non-gaseous semi-bituminous coal, the Western Range proved to be largely limestone, rendering coal that was slacker and of a poorer quality, lending itself more to the making of coke than for boiler uses. The quantity there was tremendous, however, and equalled only by similar deposits at Chi Kiang in the western part of the province where widely used coke of an excellent quality is produced.

In 1919 when trouble started with the military the little developments over on the Western Range were left undisturbed. A subsidiary organization, known as the Itai Coal Mining Company was formed to operate there and work was carried on. Other groups had begun to encroach on the rights owned by the Kiang Ho and are still working mines there, although litigation is in progress somewhere in the courts.

When all the money required for the recovery of the Lu Wang Tung had been paid out the company found itself with a deficit of Tls. 70,000. This was soon covered by the slow but steady flow of coal from the Western Range and by 1929 all was in the clear. Emphasis shifted away from the Lu Wang Tung to the Western Range and it was here that plans were finally laid for the construction of the long-suffering railway.

Labor troubles developed. The mines drew their workers chiefly from among those freed from the farms by the winter. While in summer some 5,000 carriers were kept working, this figure jumped to more than 10,000 in winter. Ingenious systems of squeeze were perfected and serious losses sustained by the company. The large labor turnover soon loomed as a major problem that had to be dealt with if continued operation were to prove feasible.

From this situation emerged, at long last, definite plans and arrangements for railway construction.

Desultory talk of building a railroad assumed the shape of direct action late in 1926. The group of Chinese business men running the Kiang Ho Coal Mining Company put their heads together under the leadership of the veteran Mr. Tong Chin-chiang. A Chinese engineer was engaged to make a survey along the Western Range for a line to serve the six mines already in operation.

His rough map and estimate, finished after three weeks in the field was rejected on grounds of what later proved to be gross inaccuracies and exorbitant price. Matters were left in abeyance until the following winter, 1927, when the group met again at Pei-Pei and decided to engage a foreign engineer to do the job. A representative, Mr. Li Yuen-kung, was sent to Shanghai. Shortly afterwards, on New Year's Day, 1928, Mr. Jesper Shultz arrived on the scene and from that date the nebulous railway project began to take form and eventually achieved under his direction the realities of clanking rails and hissing steam seen and heard for the first time on the hills of Szechuen.

Together with young and able Mr. Tong Shui-wu, nephew of the elder Tong, Mr. Shultz made a detailed and painstaking survey which he completed in March, 1928. His plans and estimates were ready two months later, calling for the construction of the line at a cost of something more than $300,000 on a 30-in. gauge basis.

Now that it began to appear as though something were actually going to be done there was an epidemic of cold feet and a barrage of ridicule from the Chungking press. Some of the original group grew skeptical and after some complications finally withdrew from the scheme, leaving a smaller group and a depleted capital available. But Tong and two of his associates stuck to their guns. Plans were reduced to the original 24-in. gauge arrangement and it was decided to go ahead with the proposition.

The Peh Chuang Railway Company came into existence and purchased the rail equipment, rusting through the years in godowns, for $35,000. Two years previously Yang Sen had brought the whole lot down from Shih-chi-ku to be used for road building purposes. But meanwhile a military turnover eliminated the versatile General Yang for the time being and the equipment remained in Kiang Peh. Many of the rails had been lost and the rest had suffered considerably through depreciation. Some $10,000 additional was spent in reconditioning and in the purchase of new parts. All was transported back up the Kialing Ho and in November, 1928, the first shovelful of dirt was turned at Wen Shin Tang.

By October, 1929, a 17-li stretch known as Section 2 was in operation and the first locomotive toot ever heard in Szechuen resounded through the countryside. It had been built on a 2% grade and completed at a cost of $170,000. The equipment had been brought up from the river in parts, carried on the backs of hundreds of coolies. Every inch of the roadbed was turned and graded by hand.

This "middle stretch" brought the rail line plump up against a rocky hill, at Bei-Miao 900 meters high, which was the last for-

midable obstacle in its path to the river which flowed past, far below, but only five li distant. Shultz took the bit in his teeth, brought up a large supply of black powder and blasted away 30,000 cubic feet of tough limestone. He constructed a roadbed around the side of the hill near the summit on a 5% grade. At a cost of only $60,000, this stretch, called Section 1, was completed in eleven months. It began operation in February of this year.

Twenty-two li of railroad now brought the line of communication to a point only 150 meters above the river level at low water, 20 meters less in summer, and left only 300 meters over which the coal has to be carried downhill to where the junks are loading. A chute is being constructed which will eliminate most of this last distance.

Whereas formerly 10,000 carrying coolies shouldered loads of coal over the same distance previously at the rate of one trip a day which netted them about 1,000 cash (about 6 cents big money, Shanghai), now slightly more than 1,000 men are able to make about 15 trips a day from the rails end to the water for 600 cash (a little more than 3 cents, Shanghai). These figures vary slightly with changes in water levels which increase or lessen the carrying distance but on an average the carrying coolie earns about 7,500 cash per day (about 50 cents, Shanghai).

Last year two new Orenstein-Koppel locomotives were brought out from Germany, one a 110-h.p. engine for use on the stepper grade, the other 70-h.p. on the more level section. Forty new self-discharging cars with a capacity of five tons were purchased and most of the old 1-ton cars discarded, although the original English engines are still in use along the line. The line has been extended at the far end an additional eight li and the farthest terminus is at a place called Tai-chia-gou, adjacent to the sixth mine operating in the range. Shultz, when I visited him, was preparing to set out on a surveying trip to the north-east. The line will eventually be extended in that direction for 90 li to meet the Chu Ho just before it flows past the important city of Hochow, completing a link which will in time prove an important shipping route and which will in any case be of inestimable value to the coal area through which it cuts.

There is one thing wrong with the picture—the coal mines. The railroad, tiny as it is, represents one of the few signs of industrial progress to be seen throughout all Szechuen. If a Ming Dynasty resident of Bei-Miao were to return for a visit from that place where all good Chinese go he would be startled by the dragon on wheels but the mines would be entirely familiar. The difference in method of operation since he collapsed under his last load of coal 500 years ago he would find negligible.

The amount of coal in the Western Range is unknown, but it is known that it was being mined there at least 1,000 years ago. Despite their operation under comparatively modern Chinese auspices, despite the progressive attitude which produced the railway, absolutely no change has been made in the mines themselves. I am not especially concerned with the commercial aspect of this backwardness, but a day spent among the workers in those mines left me with a bad taste in my mouth.

The No. 6 mine, for example, employs about 100 "men." More than two-thirds of them are under twelve, working both inside the mine and out and capable of earning on a time-piece work basis about $5 a month. In the mine shaft which is hundreds of feet long, cutting a diagonal into the heart of the hill, several score of these youngsters and a few slightly older work with picks and little handcarts—with no ventilation whatever! Someone once built a huge rotary arrangement outside the shaft designed to draw fresh air down and discharge the gases from the tunnels. When I visited the mine the hand winch was thick with rust and the high, ferris-wheel like affair was covered by several inches of painstakingly woven cobwebs.

There is no machinery of any kind in the mine or out. Water is pumped up from the lower levels by crude bamboo handpumps and carried off in a rough sluice at the main level. Coal is hacked out with picks and pushed out of the mine in small wooden, wheelless cars. Here it is dumped where others sift the dust and load the heavier pieces for portage down to the rail's end a few hundred yards away. The dust is mixed with water and deposited in fifteen-foot natural ovens where the gases are burnt off and coke produced. The mine produces by this means about 100 tons of coal a day and is the banner mine of the six served by the railroad which makes five trips daily down to the river with a total portage of about 400 tons of coal.

Of the physical appearance of the youngsters at work in the mine it is not easy to write. You have read of recent exposés of child labor conditions in the United States and in England. You read Dickens on the early years of the industrial revolution in Great Britain. There has been a lot of sobbing done by child labor agitators. All of it is heavenly felicity compared to conditions in these Szechuenese mines. Black human corpses in miniature, prematurely hardened bones and muscles doing animals' work.

But the hills conceal them. The little railroad comes down along the slope into a valley which is a green and lovely garden. Corn and wheat grow in fields bordered in places by palms! Banana trees flap their huge clumsy leaves. Every last square foot is cultivated and every last square foot gives its measure of rich harvest.

Shultz has introduced into his railroad all the pomp and circumstance of a "big-time" railroad. At every stop and start whistles are blown and flags are waved. Signalmen hop up from their posts, flags at salute, as the little train rumbles by at its 20-mile an hour clip. It seemed like a game being played by little boys.

Stations are being built along the way and two crude passenger cars are always part of the outfit. A fare schedule is prominently pasted on the door but, as Shultz put it, "all the passengers so far are part of the family."

Sooner or later Szechuen, too, may have its roaring limiteds. But for now it is content to boast of the only railroad in West China, even if it be but an infinitely small drop in the country's biggest bucket.

Speeding up the Cables

A wonderful new mechanical device to speed up the cable service is being installed at a number of Australasian stations by Imperial & International Communications, Limited. By means of the "regenerator" as this apparatus is termed, signals are automatically reinforced and flashed on from station to station. Thus, messages from London, on the London-Singapore chain now extended to Adelaide are transmitted over a chain of cables linked up by no fewer than 15 intermediate stations, and now only take three seconds to reach their destination, as against some minutes under the old system.

With the installation of regenerators at Sydney, Southport, Auckland, Norfolk Island, Suva, Fanning Island and Bamfield, B.C., the whole of the company's great network of services will have been equipped with this device, and a Pacific chain will have been established between Australia, New Zealand and Canada.

Similar improvements are also to be carried out at Porthcarnow, Fayal, Harbor Grace, Halifax, and Montreal, for the setting up of a double chain between London and Canada. Connections between these and the Pacific chain will be effected *via* the trans-Canadian land lines.

Import of Machinery into the U.S.S.R.

During the past two years the imports of machinery into the U.S.S.R. has grown as follows: 1929—178 million roubles, or 7 per cent of the world export of machinery, and in 1930—381 million roubles, or 15.5 per cent of the world export. In 1929 the U.S.S.R. ranked third amongst machinery importing countries, following Canada and England, whereas in 1930 the Soviet Union held first place. It is interesting to note that whereas in 1930 the world's trade in machinery declined by 10 per cent, imports into the U.S.S.R. comprised approximately 15 per cent of the world's export of machinery. In 1931 the relative importance of the Soviet Union as a machinery importing country will considerably increase as a result of the absolute growth of Soviet imports and the sharp decline in the purchase of machinery by all other countries.

The importance of the U.S.S.R. as an importer of machinery is evident particularly in the case of tractors for which the Soviet Union at present represents the only big market capable of maintaining the American tractor export at its previous level, as neither Canada, Argentina nor Australia are at present able to buy any considerable quantities of tractors.—*Economic Review of The Soviet Union.*

Three New Engineering Projects

ILLUSTRATING engineering progress in China are several new projects that are being carried out by Messrs. Andersen, Meyer & Co., Ltd. Three outstanding examples of enterprises going forward under direction of this firm are the building of a bridge for the Sunning Railway over the Tam River in the Toishan District of Kwangtung Province, extension of the plant of the Kwangtung Electric Supply company at Canton and the erection of a new paper mill for the Liu Ho Paper Mill company at Antung in Manchuria. Brief descriptions of these three projects are of interest.

Sunning Railway Bridge

One serious obstacle to the further development of the Sunning Railway in the south of China has been the crossing of the Tam River.

The railway has for several years worked on plans to build a bridge across the river at Kung Yet, and in June this year the plans were realized and the contract for the construction of the bridge placed.

The bridge has a steel superstructure and is a single track through truss span railway bridge with eight fixed spans and one opening span placed in the middle. The piers and abutments are reinforced concrete. The fixed spans are 162 feet center to center of bearings and the opening span is a Scherzer Rolling Lift Bridge 71 feet center to center of piers. The total length of the bridge is 1,388 feet center to center of bearings on abutments.

The width of the bridge is 16 feet and there are two five feet side walks outside the trusses. The whole bridge is planked with hardwood boards and can, therefore, be used for light vehicular traffic.

Seventy per cent of the length of the bridge is over water averaging 40 feet in depth at high water. The river bottom is fine and coarse sand overlying a strata of hard clay. The piers will be resting on this strata of hard clay.

The contract for the construction of the bridge was awarded to McDonnell & Gorman of Tientsin, Bridge Builders and General Contractors. The design of the bascule is carried out by the Scherzer Rolling Lift Bridge Co., New York; the design of the fixed spans is carried out by the American Bridge Co., a subsidiary Company of the United States Steel Corporation, who also supply the structural steel and operating machinery.

The design, superstructure, machinery and equipment are supplied through Andersen, Meyer & Co., Ltd., Shanghai, who also act as Consulting Engineers.

The work on the building site was commenced in June this year and the bridge will be completed early in 1933.

Electric Plant at Canton

The plant of the Kwangtung Electric Supply Plant at Canton at the present time consists of two 2,500 kw, one 5,000 kw. and one 6,000 kw. turbo generators complete with the usual accessories and with six boilers two of which are equipped with pulverized fuel and one with oil burner. Messrs. Andersen, Meyer & Co. have recently sold and there is now being installed a boiler of 10,000 sq. ft., heating surface manufactured by the Heine Boiler Co., a subsidiary of the Combustion Engineering Corporation of New York, which will have a capacity of 80,000 lbs., of steam per hour at 250 lbs., pressure superheated to 200°. The superheater is of the Superheater Co., of American manufacture. The boiler will be equipped with a Riley Stoker Corporation Harrington Travelling Grate stoker with forced draft and induced draft fans.

Two rather novel features in this new installation will be a Green Fuel Economizer Co.'s cinder catcher located between the boiler smoke outlet and the induced draft fan to eliminate what has proved to be a considerable nuisance, *i.e.*, the flood of cinders and fine particles of ash over the neighborhood. The other feature is the Girtaner steam ash ejector by means of which the ash from the ash pits will be blown directly into a receptacle where it can be removed by mechanical means at a considerable distance from the boiler itself. The bunker system and coal conveying system are being extended to accommodate the new boiler.

The total capacity of the plant is now being increased to 22,000 kw. by the addition of a new 6,000 kw. turbine and condensing equipment, exact duplicates of the present 6,000 kw. unit. All of the turbines are of General Electric manufacture and the condensers of Worthington Pump & Machinery Corporation's manufacture. The turbine generates at 2,300 volt, 60 cycle, 3 phase, and distributes to a rapidly increasing load in Canton. Each turbine is equipped with a steam flow meter for checking steam consumption and the new turbine will have a direct connected exciter whereas all the older turbines have separate excitation. Considerable increase in switchgear has been made necessary by the continually increasing load and increased capacity of the plant, and this also is being supplied by the General Electric Co.

New circulating pumps for the condensers are not being supplied as the two circulating pumps for the first two units are being rendered practically double in capacity by the simple changing of the impellers and motors, effecting thus a considerable saving in first cost and without any loss in economy.

All of the old turbines have been provided with air washers of the Spray Engineering Co's manufacture for cooling and washing the air for ventilating the generator. The new turbine, however, will be equipped with a General Electric Co. surface air cooler through which the air for ventilation is continually circulated and cooled.

One of the outstanding advantages of this type of apparatus is the small amount of air available in the ventilating circuit for combustion in case of a fire on the generator windings. The circuit being entirely closed, any fire starting in the windings will quickly exhaust all the oxygen available and be automatically smothered. Another outstanding advantage is the absolute impossibility of moisture being present in the cooling air; and, of course, no power is required for operating a surface air cooler, except the small amount required to pump the additional water for cooling, this water being taken from the circulating water mains.

The Kwantung Electric Supply Company's plant, although considerably pressed for room for expansion, has nevertheless maintained a high standard of equipment and has always been under very efficient management so that very excellent economies have been produced. These economies will undoubtedly be even greater with the new steaming and generating capacity which are now being installed on order to Messrs. Andersen, Meyer & Co., Ltd.

New Paper Mill in Manchuria

The present equipment of Liu Ho Cheng Paper Mill Co. of Antung, Manchuria, was supplied by Japanese manufacturers who erected the same and put it into operation. The present output is about 2½ tons per 24-hour day of good paper. Two grades are made: white and unbleached or tan, which are used for Chinese writing paper and to make notebooks and account books.

The pulp is made from a species of reed stalks and other raw materials are not available or used.

Messrs. Andersen, Meyer & Co., Ltd. through their Mukden Office recently signed a contract with the Liu Ho Cheng Paper Mill Co. for the sale and erection of an extension to their present plant, capable of producing 10 tons of 2,240 lbs. of bleached paper per day.

The paper mill machinery is being supplied by James Bertram & Son Ltd. of Edinburgh, who are one of the foremost engineers specializing in paper making machinery. They have supplied about 90 per cent of the paper making machinery now in use in India and have had considerable experience in handling raw materials such as used by the Liu Ho Cheng Paper Mill Co.

The new plant consists of the usual cutters, dusters, digesters, washing and heating engine, bleachers, beaters, chemical house, paper making machine and finishing house.

(Continued on page 592.)

ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW

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HAS JAPAN THE RIGHT TO DEFEND HERSELF?

THE ROAD TO UNITY

"EXTRACTED UNDER DURESS"

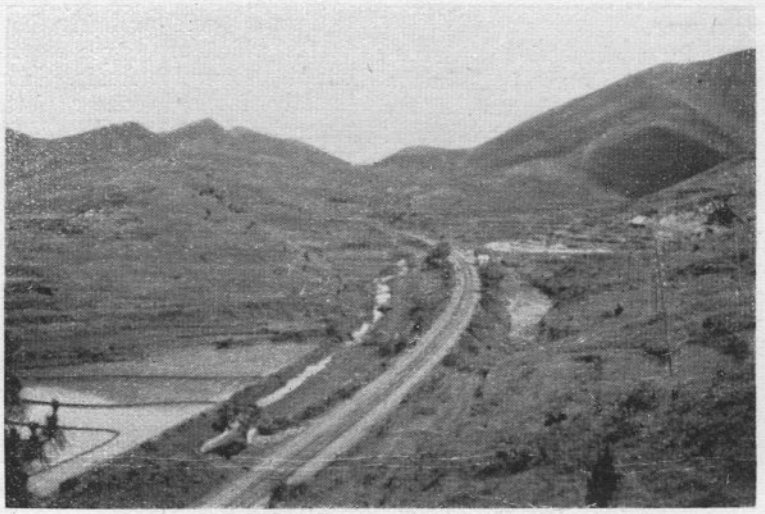
Vol. XXVII | OCTOBER, 1931 | No. 10

Long Distance Telephone Service Now Links Hongkong and Canton

A NEW era of rapid telephone communication in China began on September 1, when long distance telephone service was established between the cities of Hongkong and Canton. This was made possible through the progressiveness of the Hongkong Telephone Company, Ltd. and the Canton Municipal Telephone Administration. The new service was formally inaugurated by Sir William Peel, Governor of Hongkong, calling Mr. Lin Yun-koy, Chairman of the Kwangtung Provincial Government. A feature of the ceremony was the sending of pictures and facsimiles of documents including Chinese characters by means of telephoto apparatus. Demonstrations were also conducted showing the operation of combination—sending and receiving teleprinters whereby messages were typed on one end and simultaneously transmitted to and recorded on the other end.

The service is rendered through a specially designed lead covered and steel taped armored cable which was placed underground along the entire route in order to minimize the possibilities of interruption due to atmospheric conditions or other external forces. Both managements realized that to furnish an absolutely dependable service it was necessary to place the cables underground throughout practically its entire course. The operating practice is based on the most modern long distance traffic methods, the key note of which is the completion of calls on a no-delay basis while the subscriber waits on the line.

The cable consists of 20 pairs of wires in 10 quads and provides 20 physical circuits and 10 phantom circuits over which 30 conversations may be held simultaneously. Although the cities are situated only 85 miles apart (air line measurements) the actual length of the cable is about 120 miles due to the nature of the country traversed and the need for a protected right-of-way. The design of the cable is such that for the greater part of the route it was placed in a trench about two feet deep without using any special conduit protection.



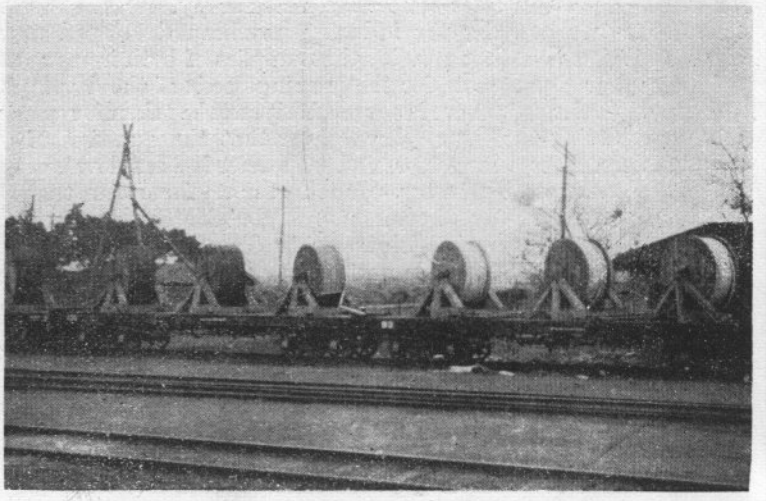
General view of Mountain Country through which the Cable Runs

The route from Canton runs through various types of country including low swampy land, rocky mountainous country, river crossings, a railway tunnel and finally across the harbor from Kowloon to Hongkong. The work of laying the cable commenced from the Canton end on January 17, 1931, and was completed on August 10. After leaving Canton the route follows the railroad for the greater part of the distance. A special train was utilized in those parts to transport the cable, the laying of which was done mostly at night directly from the drums mounted on railway cars.

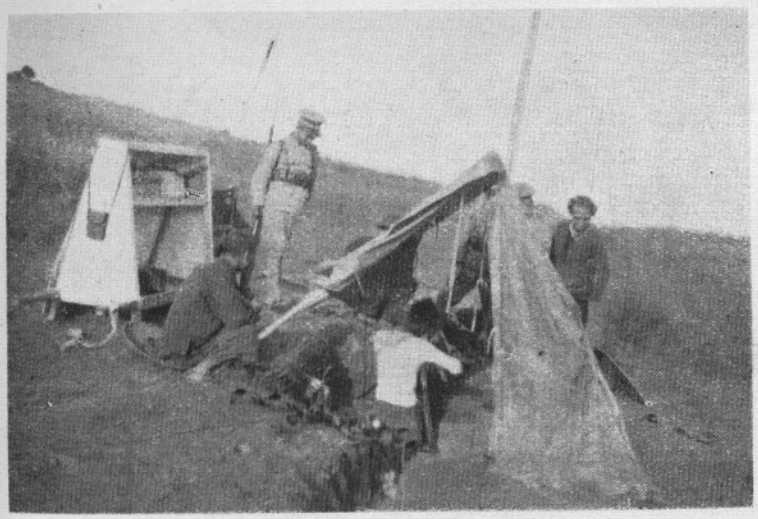
When long water crossings were encountered, some of which were in excess of 1,000 feet, junk boats were employed to carry the cable across. The cable sections at those points were constructed of special wire armor for submarine protection. Floods frequently interrupted the progress of the job. In many cases the cable had to be raised above the ground in order to make the splices (joints) as it was important that the inside of the cable be kept dry. Several times splices were made under difficult conditions three feet below flood level. Work had to be temporarily abandoned on several occasions due to high water conditions. The submarine cable which crosses the harbor from Kowloon to Hongkong is about 1.2 miles long. This section of the cable was fabricated and shipped in one length thereby eliminating the necessity for making splices and also permitting the cable to be laid directly into position.

The testing and splicing work which was, perhaps, the most important features in the successful completion of the job followed closely upon the laying of each section. Each length of cable was tested to ascertain its electrical characteristics and several lengths were then joined together to form sections about 1.2 miles long. When these sections were completed, dried air under pressure was applied in order to make sure that both the cable and splices were air-tight. The next operation was the placing of loading coils in a sealed case in a concrete man-hole at the end of

Pulling in First Length of Cable in Canton



Cable Tram ready for Night Laying



A Joining Squad at Work

Turning a Cable Drum in Streets of Canton

each section and, after further tests, joining the several sections together through the loading coils so as to produce continuously balanced circuits.

The cable for the project and the special switch-board equipment on the Canton end were supplied and installed by the China Electric Company, a subsidiary of the International Telephone and Telegraph Corporation which is also the parent company of the Shanghai Telephone Company. The cable, teleprinters and telephoto apparatus were manufactured by companies also associated with the International Telephone and Telegraph Corporation.

Transmits Pictures

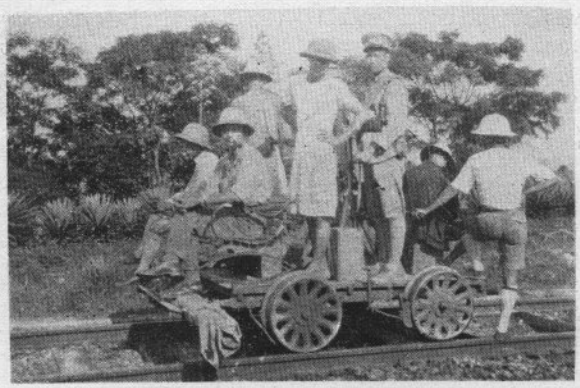
Following opening of the new Hongkong-Canton telephone service the mode of transferring photographs and documents as described in the *Hongkong Weekly Press* is as follows :

The photograph or document is inserted in the transmitting apparatus and the current switched on. The matter to be sent is affixed to a drum which slowly revolves. An intensified light beam is directed on to the picture and the reflected light from this beam affects a photo electric valve which controls the current to be passed out to the line after amplification. At the receiving end the received current is again amplified and passed through coils which affect the movements of a small suspended magnet upon which is fixed a mirror.

The reflections from this mirror are transmitted through lenses to sensitized paper or a film. The vibrations on the mirror are, of course, in complete accord with the vibrations or varied reflections of light caused at the sending end by the light and shade on the item being transmitted.

A number of photographs and letters have been transmitted already over the line, and the reproduction is perfect.

The teleprinter is, in effect, a distant typewriter. The demonstration model fitted in the offices of the Telephone Company is connected by wires in the toll cable to another one in the offices of the Canton Telephone Administration in Canton, and a typist without any technical skill whatever can proceed to type messages in Hongkong, which are received in Canton, and *vice versa*. The message is typed on to a strip at both ends and is cut up and pasted on to a form, if required, to make it up as a letter.

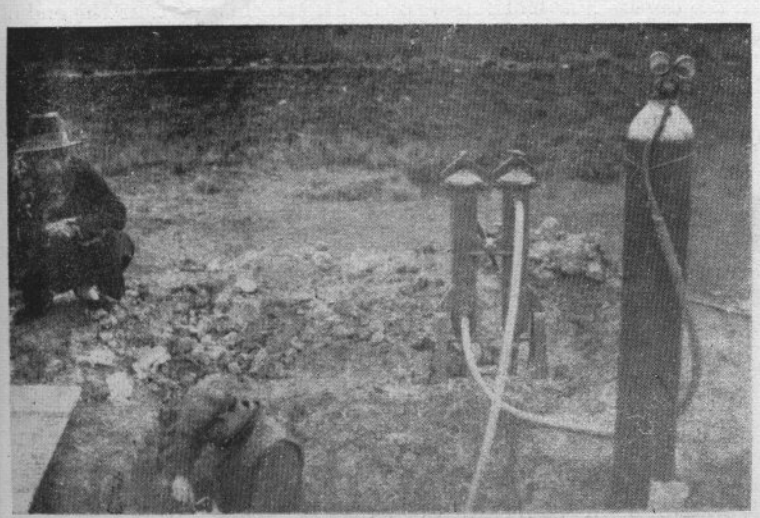


Pump-Handle "Trolley-Mobile" Transport Setting out on Job complete with National Guard

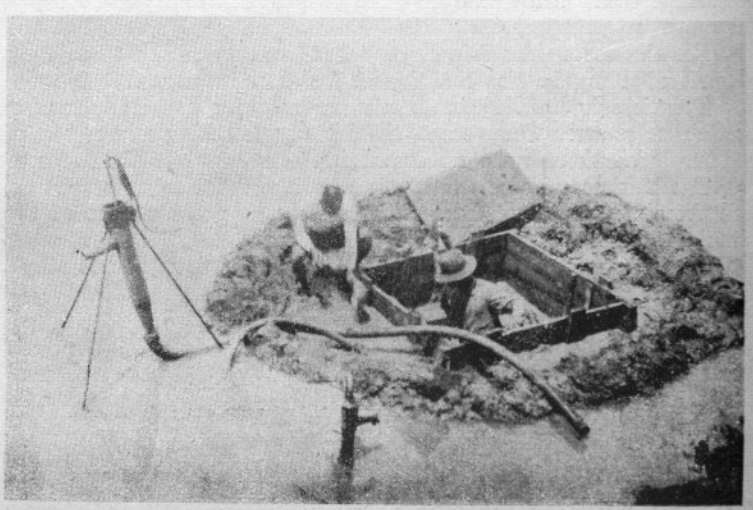
In a report published by the *Overland China Mail* the cost of the undertaking is placed at £120,000 and this journal gives interesting details of the manner in which the work was done, saying the operations began at the end of January, 1931, and were completed on August 4.

Mr. Burnett, of the International Telegraph and Telephone Company, was in charge of the work and had associated with him Mr. Graham, Mr. Barkwith and Mr. Westerhout, all of the Standard Telephone and Cables Company.

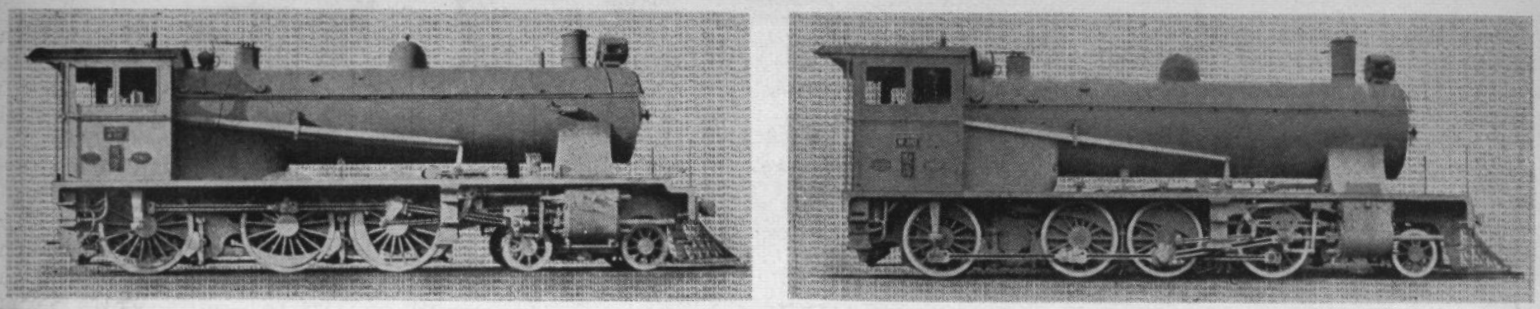
Under them they had a labor force of 150 Chinese. The laborers had to be trained before starting work. They had never seen or heard of a telephone cable before. But they were quick learners and, with the capable tuition they received, attained



Air Pressure Testing



After week of fine weather Banking for a Loading Joint made three feet below Flood Level



Types of locomotive supplied for the Lunghai Railway by the Belgian Compagnie General de Chemins de Fer and Tramways en Chine. At left a "ten wheel" 4-6-0 compound passenger locomotive; at right "Consolidation" 2-8-0 freight locomotive

More Work on the Lung-Hai Railway

By KINGWELL J. TSHA

THE Lingpao section of the Lung-Hai Railway runs westward along the Yangtze River from Lingpao to Tungkwan *via* Wensianghsien, Kiaopan and Pantaochun, a distance of 70 *kung li* (kilometers). The country through which this section of the railway passes is very mountainous, and consequently the building of many tunnels is necessary and numerous bridges have to be constructed in order to shorten the line as much as possible. The longest bridge is at Kienho, near Henkoukwan, the next in size being those at Wensien and Wentichun.

The building of the Lingpao-Tungkwan section was started about seven years ago. After completion of the Kwanyintan-Shenchow and Shenchow-Sian sections, construction work on the Lingpao-Tungkwan section was begun, in the hope that the entire Lung-Hai line would be soon in operation, but progress has been much slower than anticipated, and the Lingpao-Tungkwan section was not completed until last year (1930), the cost of construction amounting to over $10,000,000.

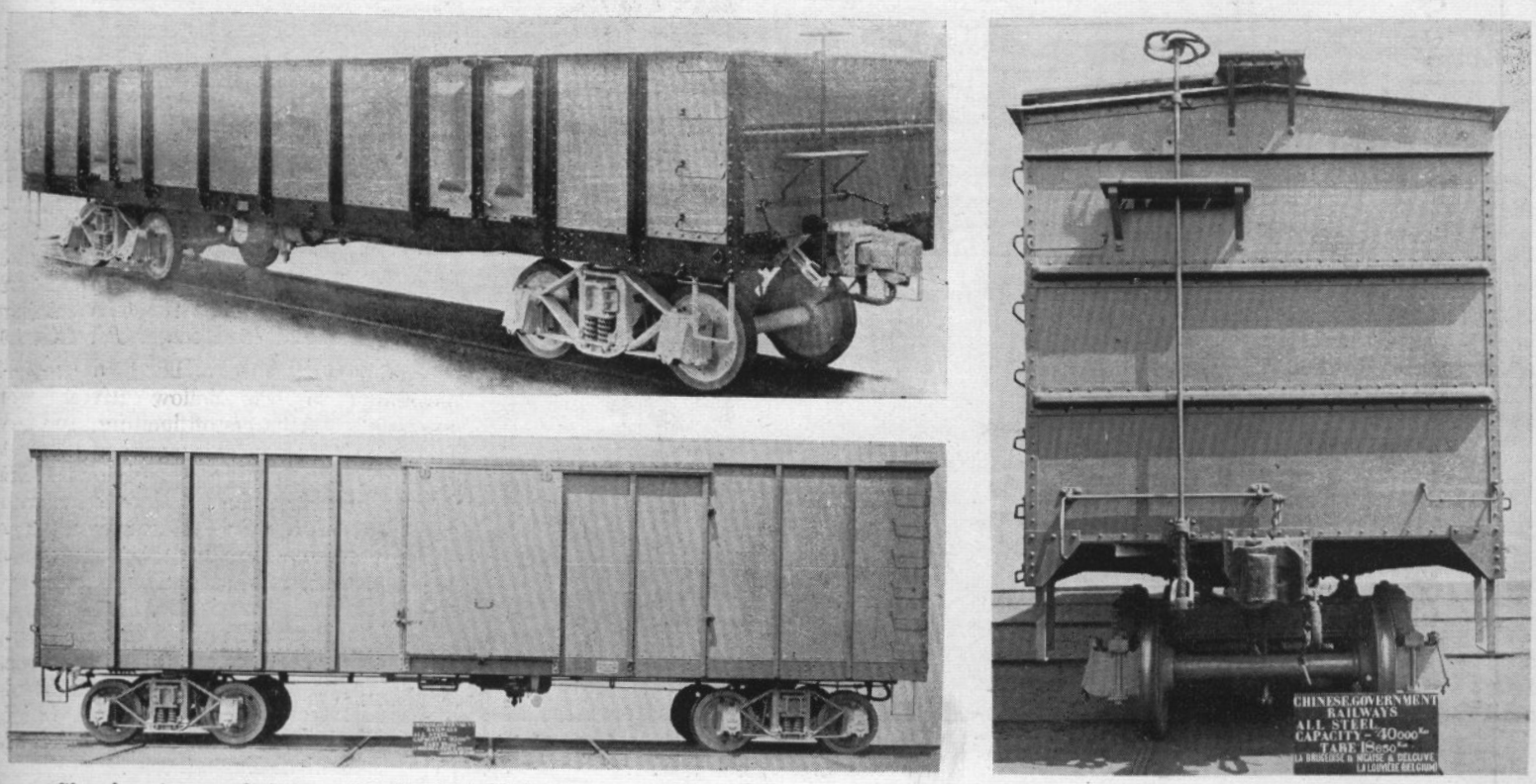
Along the Lingpao-Tungkwan section there are many curves varying in radius from 350 to 2,000 *kung chih* (meters). The biggest gradient on this section does not exceed 1 in 100. There are 11 tunnels along the section, and the same number of stations, as follows: Lingpao, Chiaochuyichuan, Changkiawan, Yihchuan, Wensien, Kaopan, Pantouchan, Chiaochuyichuan, Wentichen, Chiaochuyichen and Tungkwan.

The total length of embankment erected along the Yellow River for protection against floods amounts to 1,200 meters.

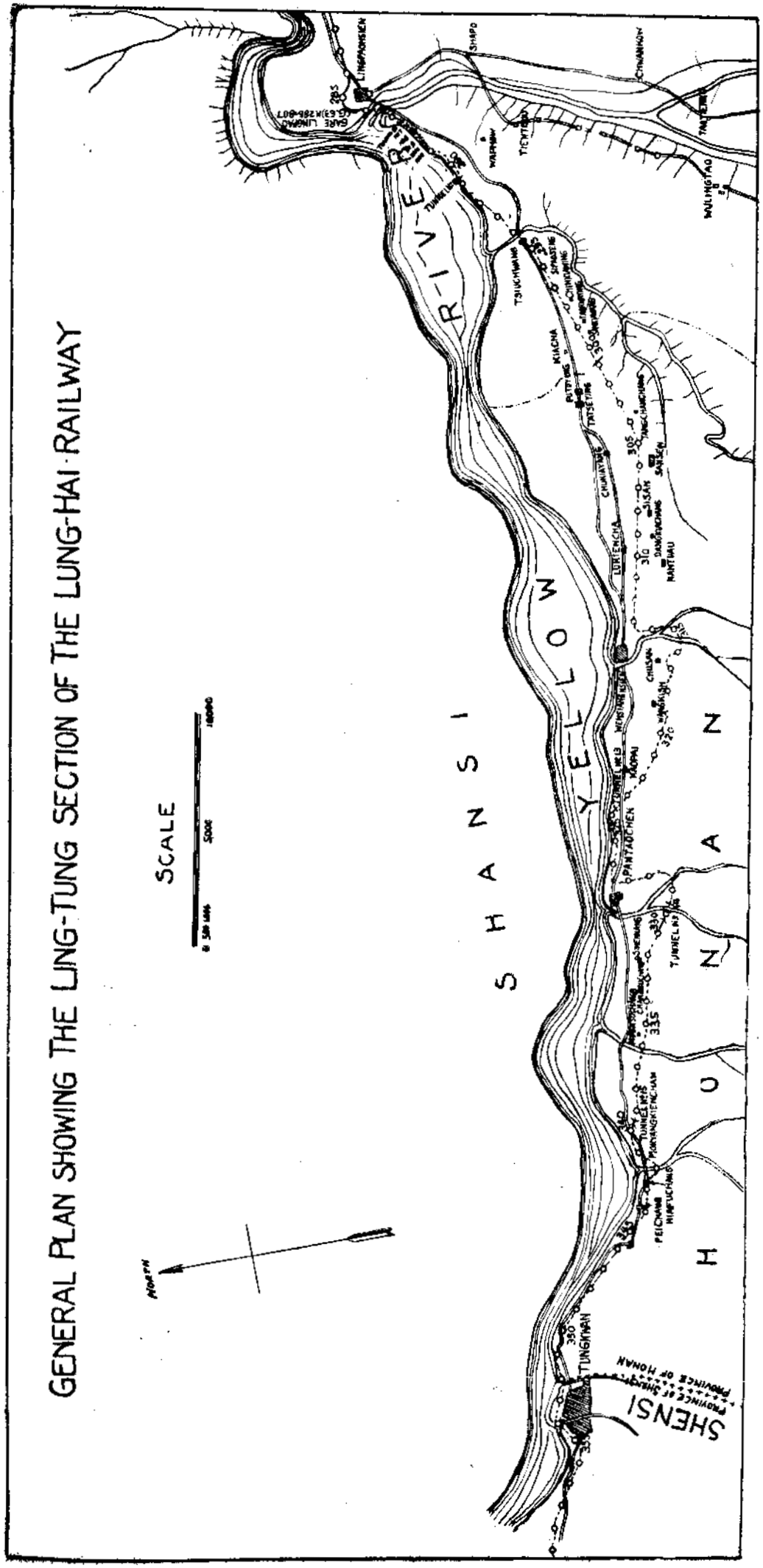
Ferro-concrete has been very largely used in the building of bridges and similar constructional works. The proportion of cement, gravel, sand and lime varied according to the purpose for which cement or concrete was to be used. The following are the various grades and their components:

CEMENT.

Grade	*Sand (Cubic meter)*	*Lime (Cubic meter)*	*Cement (Barrels of 170 kilo)*
A	1	0.50	1
B	1	0.50	1
C	1	0.50	1½
D	1	0.50	2
E	1	0.50	2½
F	1	0.50	3
G	1	0.50	3½
H	1	0.50	4½
I	1	0.50	5
J	1	0.50	5½
K	1	0.50	6½



Showing types of 40-ton All Steel freight wagons supplied by Belgian Syndicate in 1930 from the Belgian Indemnity Fund



CONCRETE.

Grade	Gravel (Cubic meter)	Cement (Quantity and Grade)	
b	1	0.60 (cubic meter)	B
c	1	0.60 ,, ,,	C
d	1	0.60 ,, ,,	D
e	1	0.60 ,, ,,	E
f	1	0.60 ,, ,,	F
g	1	0.60 ,, ,,	G
h	1	0.60 ,, ,,	H
i	1	0.60 ,, ,,	I
j	1	0.60 ,, ,,	J

There are nine large bridges along the Ling-Tung section and many smaller ones. The big bridges are as follows:

		Cost
Lingpao		$99,195
Chusong		110,220
Wensien		43,583
Pantou	(No. 1)	55,000
,,	(No. 2)	57,661
Wentichen	(No. 1)	70,000
,,	(No. 2)	50,061
Tungkwan	(No. 1)	22,000
,,	(No. 2)	35,000

In driving tunnels the cost naturally varies with the nature of hills to be pierced, ranging from $250 to $300 per *kung chih* or meter. The following are the detailed figures for building tunnel No. 17, near Tungkwan, showing the cost per *kung chih*:

Boring	$76.00
Cement and Bricks	60.19
Tunnel (roof and sides)	62.24
Tunnel (base)	28.98
Gravel	4.82
Sand	2.40
Woodwork	16.00
Labor...	13.51
Miscellaneous	13.20
Total	$277.34

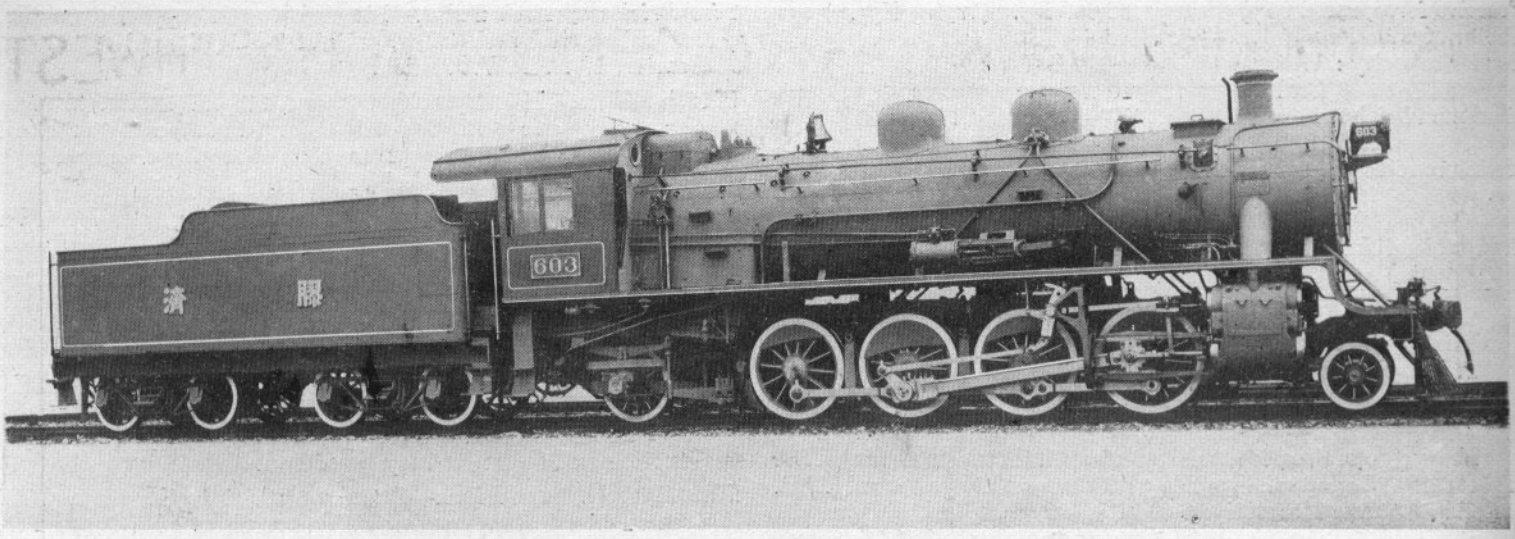
Along the section there are 11 tunnels, brief particulars of which are as follows:

Tunnel No.	*Length (meter)*	*Cost*
6	90.50	$26,955
7	621.20	163,685
8	90.30	33,320
9	107.40	37,943
10B... ...	2,800.00	988,000
12	622.60	176,741
13	695.00	172,000
14	631.84	147,000
15	395.00	95,320
16	909.10	227,500
17	1,080.00	324,000

Tunnels No. 10 and 11, owing to their proximity to the Yellow River, were exposed to the danger of flooding, and have collapsed or been damaged to such an extent as to prevent their use for the time being. However, means of communication have to be maintained and the building of a temporary line is necessary, the cost of which is estimated as follows:

Levelling	$4,200
Drainage	40,800
Conservancy	3,000
Embankments	80,000
Building track material and labor	65,000
Miscellaneous	7,000
Total	$200,000

(Continued on page 621)



One of the four new Mikado type locomotives

A Signal Achievement

Four New "Mikado" Type Locomotives are Built for the Chinese National Government by the South Manchuria Railway Works

In the production for the National Chinese Government of four new locomotives that have gone into service on the Kiaochow-Tsinan Line, the South Manchuria Railway Works, located at Sakako in the Suburbs of Dairen, scored a signal achievement. In the past these works largely have confined their activities to the production of rolling stock exclusively for the South Manchuria Railway, but the building of these four locomotives for the Chinese Government brings the Sakako Works into the rank of a formidable competitor of locomotive builders throughout the world.

When the Ministry of Railways at Nanking, some time ago, asked for tenders for the construction of four new locomotives to be used on the Kiaochow-Tsinan Line, the South Manchuria Railway Works obtained the contract in competition with numerous foreign locomotive builders and at an exceedingly low figure. The building of these four locomotives followed a preceding contract under the terms of which four "Pacific" type locomotives were built in 1928 for the Ssupingkai-Taonan Railway. Although the South Manchuria Railway Works have built locomotives and other rolling stock for roads in North China, hitherto the contract for the "Mikado" type locomotives on the Kiaochow-Tsinan Line was the first ever obtained from the National Government of China. Besides the low price quoted, undoubtedly another important factor in the transaction was the fortunate location of the Works at Sakako.

The contract was finally concluded on February 9, last, and the first of the locomotives produced was given a trial run on July 10, in the presence of Chinese and Japanese representatives interested. This trial run was between Sakako and Chinchou, a distance of 28.5 kilometers, and in all respects satisfactory results were obtained. The completion of the first locomotive within a period of five months also constituted a record as hitherto locomotives purchased from other builders could only be brought into service after much longer periods.

The new "Mikado" type locomotive supplied under contract has a working order of 146 metric tons, and the maximum tractive power of 16,370 kilogrammes (36,089 lbs.).

The new locomotives were handed over to the Kiaochow-Tsinan Railway authorities at Mukden and were transported over the tracks of the Peiping-Liaoning Railway, and thence over the Tientsin-Pukow Railway to Tsinan, whence they were transferred to the Kiaochow-Tsinan Line, on which they are now in service, pulling goods trains.

It is to be remarked that save for special few accessories all materials used in the four "Mikado" type locomotives are of Japanese manufacture. It is said that the tyres, wheel centers and main frames, which were manufactured by the Sumitomo Steel Works are superior to those produced in Europe and America.

The complete specifications of the "Mikado" type locomotive are given as follows:—

Mikado Type Locomotives

(*English units used throughout, Metric units shown in parenthesis*)

Gauge of track		14′—8½″	(1,435 mm.)
Diameter of cylinders		21″	(533 mm.)
Piston stroke		26″	(660 mm.)
Driving wheel diameter		54″	(1,372 mm.)
Boiler working pressure		200 lbs/sq. in.	(14.06 Kgs/sq. cm.)
Wheel base : Driving, Rigid		15′—6″	(4,724 mm.)
Engine only		31′—6″	(9,601 ,,)
Engine and Tender		62′—9″	(19,126 ,,)
Approximate weight in working order :			
Front truck		20,200 lbs.	(9,160 Kgs.)
Driving wheels		143,000 ,,	(64,860 ,,)
Trailing wheels		34,700 ,,	(15,730 ,,)
Engine only		197,900 ,,	(89,750 ,,)
Tender (without Stoker)		124,200 ,,	(56,330 ,,)
Engine and Tender		322,100 ,,	(146,080 ,,)
Kind of fuel :		Soft coal	
Boiler : Largest course, outside		72″	(1,829 mm.)
Smallest course, inside		65″	(1,651 ,,)
Fire box : Length		96 1/16″	(2,440 ,,)
Width		65¼″	(1,656 ,,)
Tubes : Number		139	
Outside diameter		2″	(51 ,,)
Length		16′—0″	4,877 ,,)
Flues : Number		24	
Outside diameter		5⅜″	(137 ,,)
Length		16′—0″	(4,877 ,,)
Arch tubes : Number		3	
Outside diameter		3″	(76 ,,)
Heating surfaces : Tubes		1,158 sq. ft.	(107.58 sq. M.)
Flues		538 ,,	(49.98 ,,)
Arch tubes		18 ,,	(1.67 ,,)
Fire box		179 ,,	(16.63 ,,)
Total		1,893 ,,	(175.86 ,,)
Superheating surfaces		458 sq. ft.	(42.55 ,,)
Grate area		43.5 sq. ft.	(4.04 ,,)

Tractive force, rated 85% ...	36,090 lbs.	(16,370 Kgs.)
Factor of adhesion	3.96	
Tender capacity: Water ...	6,000 Gallons	
Coal	10 Tons	
Maximum height of engine ...	13′—6″	(4,115 mm.)
,, width .. ,, ...	9′—11″	(3,023 ,,)
Minimum radius of curve to pass	16°	(120 M.)

LIMITATION

Turn table, diameter	70′—0″	(21,336 mm.)
Limit of weight:		
Front truck	10 Tons	(2,240 lbs.)
Driving wheel	16 ,,	(,,)
Trailing wheel	15½ ,,	(,,)

GENERAL DESIGN

The design of these locomotives are such that maximum number of parts are to be interchangeable with those on the previous K.T.R. consolidation type locomotives.

Boiler and Boiler Fittings

Boiler.—Boiler type, inverted slope type, inside diameter of waist at front end, 65-in. (1,651 mm.), largest course, 72-in. (1,956 mm.) outside diameter, material of shell homogeneous boiler steel. Dome well secured to boiler, shell thoroughly reinforced at opening.

Boiler well designed thoroughly braced and stayed, of very best workmanship, and capable of carrying with a factor of safety of 4½, a working pressure of 200 lbs. per sq. inch (14.06 Kgs. per sq. cm.).

Boiler tested, with steam to 20 per cent and with hot water to 25 per cent above working pressure.

Sloping backhead and throat sheet.

Horizontal seams, butt jointed and multiple riveted with welt strips inside and outside.

Plates planed at edges and calked with round nose tool.

Rivet holes reamed, after assembling, to insure uniform holes and slightly countersunk under heads of rivets.

Rivets driven by hydraulic or pneumatic pressure wherever possible. 28-in. (710 mm.) combustion chamber.

Franklin Automatic Butterfly Type Firedoor applied.

Fire Box.—Fire box of homogeneous fire box steel. Length inside 96 1/16-in. (2,440 mm.). Width inside 65¼-in. (1,656 mm.), at grate surface.

Thickness of crown and side ⅜-in. (9.5 mm.), tube sheet ½-in. (12.7 mm.), back ⅜-in. (9.5 mm.).

Water space front 4½-in. (114 mm.), sides and back 4-in. (102 mm.), combustion chamber 5½-in. (140 mm.).

Two fusible plugs on top of crown sheet.

Mud Ring.—Mud ring accurately fitted and substantially double riveted.

Staybolts.—Staybolts of staybolt steel 1-in. (25.4 mm.), diameter, screwed and riveted to sheets, spaced not over 4-in. (102 mm.) from center to center, and pneumatically driven. Telltail holes drilled to outer ends, about 3/16-in. (5 mm.) in diameter, 1¼-in. (32 mm.) deep. Crown sheet supported by radial stays of staybolt steel. Body 15/16-in. (24 mm.) diameter, with enlarged ends, screwed through the crown and shell and riveted over except six of center rows which have button heads under crown.

Suitable number of front transverse rows to be flexible expansion stays.

Alco. type flexible stays in breaking zone to be about 500 in number.

Superheater.—The Superheater Co.'s firetube type "A" with machine forged return bend. The superheater units to be of seamless steel, of 1½-in. (38 mm.) outside dia. No. 9 B.W.G. thick.

Tubes.—Tubes of seamless steel No. 12 B.W.G. (2.8 mm.) thick 139 in number, 2-in. (51 mm.) outside diameter 16-ft. 9-in. (4,877 mm.) long, set with copper ferules at fire box end, ¾-in. (19 mm.) tube spaces. 24 superheater flues of seamless steel 5⅜-in. (137 mm.) outside diameter, No. 9 B.W.G. (3.8 mm.) thick, 16-ft. 0-in. (4,877 mm.) long.

Fire Brick and Arch Tubes.—Fire brick arch supported on three seamless steel arch tubes, each of 3-in. (76 mm.) outside diameter, No. 7 B.W.G. thick.

Cleaning Holes.—Housley washout plugs, 4-2⅞-in. (73 mm.) diameter, on each corner of fire box, 20—2-in. (51 mm.) diameter distributed on sides and ends of fire box, above fire door and crown sheet, and for washing shell of boiler.

Blow-off Cocks.—Blow-off cocks, two everlasting, one located at each side of fire box.

Safety Valves.—Safety valves, three 3-in. (76 mm.) Consolidated type safety valve, one muffled and two open pops.

Water Supply.—Furnished by two Hancock No. 4000-HNL non-lifting inspirators, one located on each side of engine, below cab.

Hancock Double Vertical Check Valve on the top of boiler.

The steam and delivery pipes shall be of polished copper suction and over flow may be of iron.

Throttle and Steam Pipes.—American multiple throttle valve in smoke box, in combination with a superheater header, and cast iron outside steam pipes. A shut-off valve in the dome.

Grate.—Dump plates in front and rear are to be provided for in addition to cast iron rocking bars suitable for fuel.

Ash Pan.—Ash pan of steel plate, with sliding type doors. Sprinkling pipes at ash pan either from overflow or delivery pipe of inspirators.

Smoke Box.—Smoke box extended and fitted with netting, and deflecting plates.

Door of pressed steel, carefully fitted.

Smoke Stack.—Smoke stack, straight type with copper top, designed to give maximum draft. Top to have suitable flare.

Turret.—Turret located just on front of cab, and valve handles for operation to be brought inside of cab on a panel conveniently located and each handle clearly marked.

Gauge Cocks and Water Glass.—One Hancock water column with 8½ Klinger reflex glass and cocks.

Whistle.—One 5 chamber chime whistle to be applied.

Steam Gauge.—Ashcroft steam gauge, graduated in lbs. per sq. inch.

Frames, Cylinders, etc.

Frames.—Frames of cast steel, ample strength, thoroughly annealed. Single forward section provided with lugs for holding cylinders.

Frame thoroughly braced together and to boiler by suitable castings, braces, expansion plates and pads. Pedestals protected from wear by cast iron shoes and adjustable wedges and securely fastened together at bottom of pedestal.

Separate slabbed section at rear.

Cylinders.—Cylinder, diameter 21-in. (533 mm.), stroke 26-in. (660 mm.) of improved close grained cast iron as strong as can be worked. Cast with half saddle attached, secured together in a substantial manner and accurately bolted and keyed to frames.

Cylinder bushings of hard close grained cast iron.

By-pass valve Mellin type to be fitted.

Drain Cocks.—Four Automatic "Ardco" drain cocks applied.

Pistons.—Piston of build-up "Z" type, cast steel body with cast iron bull-ring, and fitted with cast iron packing rings.

Piston rods of best hammered steel, ample diameter, properly fitted and securely fastened to pistons and crossheads.

Valves.—Steam chest valves American Locomotive Co.'s standard piston type, having 11-in. (279 mm.) diameter.

Valve Motion.—Walschaert valve motion graduated to cut off equally at all points of stroke. Detail parts of soft steel with case-hardened wearing surfaces.

Reverse gear fitted with Alco type power reverse gear, right hand driven.

Rod Packings.—Metallic packing on piston rod and valve stems.

Guides.—Two bar type of steel, securely bolted to cylinder heads and to rigid guide yoke extending across frames.

Crosshead.—Crossheads alligator type of best cast steel with cast iron shoes babbitted, ample bearing surfaces.

Driving Wheels, Rod, etc.

Driving Wheels.—Driving wheels, number 8, diameter 54-in. (1,372 mm.), with cast steel centers, diameter 47-in. (1,194 mm.), carefully proportioned and accurately counterbalanced.

Bronze hub liners in all drivers.

Tires.—Tires of open hearth steel (hard quality), 3½-in. (89 mm.) thick. All of flanged tires, 5½-in. (140 mm.) wide.

Tire profile and distance of wheel flanges to be exactly finished, as required.

Tire shrunk on center.

Axles.—Axles of hammered open-hearth steel, finished in best manner.

All journals, 9-in. (229 mm.) in diameter by 11-in. (279 mm.) long.

Boxes.—Boxes of cast steel, with deep flanges and large oil cellars, and carefully fitted with heavy bronze bearing arranged with suitable oil grooves.

Springs.—Driving springs of best open hearth steel, tempered in oil, and secured to a system of equalizing beams to insure the engine running as smoothly as possible.

Rods.—Connecting rods of hammered open hearth steel, of I section, fitted with adjustable bronze bearing.

Side rod of hammered open hearth steel, with bronze bushings.

Crank Pins.—Crank pins of best hammered open hearth steel, with ample bearing surfaces.

Lubrication.—All bearings on engine provided with suitable means for their proper lubrication, adjustable oil cups on guides and suitable oil or grease cups on rods.

Cylinders and valves oiled from cab through ½-in. (13 mm.) copper pipes under jacket by lubricator. Nathan five feed bulls-eye lubricator applied.

Leading and Trailing Trucks

Leading Truck.—Frame of leading truck of best cast steel, carefully annealed. Truck boxes of cast iron with bronze bearings, boxes working in suitable pedestals with approved arrangement of equalizing beams and springs. Radial center bearing of ample diameter.

Springs.—Springs of best open hearth steel, tempered in oil.

Wheels and Axle.—Two steel tired wheels of 31½-in. (800 mm.) in diameter, with cast steel spoke centers.

Tires of open hearth steel 3-in. (76 mm.) thick by 5¼-in. (133 mm.) wide.

Axle of best hammered open hearth steel finished all over, with journals of 5½-in. (140 mm.) in diameter by 10-in (254 mm.) long.

Trailing Truck.—2-wheel radial type with outside journals. Boxes of cast steel with bronze bearing, and face liners.

Wheels and Axle.—Trailing wheels of 42-in. (1,067 mm.) in diameter, with cast steel spoke centers.

Tires of open hearth steel 3-in. (76 mm.) thick by 5¼-in. (133 mm.) wide.

Axle of best hammered open hearth steel finished all over, with journals of 6-in. (152 mm.) in diameter by 14-in. (356 mm.) long.

Springs.—Spring of best open hearth steel, tempered in oil.

Cab, Pilot and Fixtures

Cab.—Cab substantially built of steel plate, thoroughly braced and secured to boiler and running board, furnished with suitable sliding windows and with convenient tool boxes, seats, cushions and arm rests for engineer and fireman. Right hand drive.

Running Boards.—Running boards of checkered steel plate. Edges to be polished.

Pilot.—Pilot of iron 92-in. (2,340 mm.) wide.

Engine Coupler.—Alliance Automatic or similar pattern, Pocket type, 42-in. (1,067 mm.) from center of coupler to top of rail, in working order.

Sand Box.—Sand box of ample capacity arranged with suitable valves and pipes. Leach Pneumatic Sander double.

Head Light.—One headlight, at front, Pyle-National "K-2" type, turbo generator.

Fixtures.—Engine provided with support for headlight, bronze chime whistle, steam gauge, water gauge, gauge cocks, blowers, incandescent cab lamps, etc.

Steam Heat.—Cold steam heating equipment applied.

Bell.—Bronze bell with pneumatic ringer.

Tender

Frame.—Frame substantially built of steel channels thoroughly braced.

Coupler.—Alliance Automatic or similar pattern, 42-in. (1,067 mm.) from center of coupler to top of rail, tender 2/3 loaded.

Draft Gear.—Bradford rocker type or Edgewater type.

Trucks.—Two four-wheel center bearing trucks, arch bar type with heavy cast steel bolsters.

Springs.—Springs of best open hearth steel tempered in oil.

Wheels.—Wheels number 8, diameter 39½-in. (1,000 mm.) cast steel spoke center with 3-in. (76 mm.) thick 5¼-in. (133 mm.) wide.

Axles.—Axles of hammered steel, with journal of 5-in. (127 mm.) in diameter by 9-in. (229 mm.) long.

Brake.—Brake on both trucks with suitable brake beams.

Tank.—Tank water bottom type, made of steel plates strongly riveted together, with angle iron corners, thoroughly braced and stayed, and well secured to tender frame. Coal gates of steel.

Water capacity 6,000 gallons, Coal capacity 10 tons.

Tool Boxes.—Tool boxes of steel plate.

Brakes and Special Ties

Brakes.—Westinghouse American Combined Automatic and straight air brakes, Schedule ET No. 6, applied on all drivers, to tender wheels and for train connections front and rear. 12-in. brake cylinder.

Air Pump.—One 8½-in. (216 mm.) Cross compound air compressor on the left side of the boiler.

Lagging.—Boiler, cylinders, steam pipes, backhead and fire box under running boards lagged with sectional magnetia or asbestos mattresses.

All exposed pipes for steam and water to be lagged.

Jacket.—Boiler barrel, smoke box, cylinders, steam pipes, backhead and fire box under running boards jacketed with No. 16 B.W.G. thick steel sheets.

Tools.—Engine provided with all necessary wrenches, firing tools, hammers, chisels, packing tools, one pinch bar, one scoop shovel, oil cans and torch.

Necessary tools for tube, flue and arch tube workings.

Two traversing jacks.

General Finish

Cylinder Head Casing.—Cylinder head and steam chest head casings, front and back, pressed steel as polished.

Piping.—Piping to be carried underneath running boards and hidden from view as much as possible.

Templates.—All principal parts of engine to be fitted to gauges and templates so that they may be interchangeable.

Screw Threads.—All screw threads Whitworth standard except where finer threads are required.

Special fittings manufactured outside to have maker's standard threads, unless Whitworth threads also can be furnished.

Bolts and Nuts.—All finished removable nuts to be case-hardened.

Numbering.—All numbering and lettering to be attended to by the Railway.

Painting.—Engine and tender to be completely painted with two coats of lead color, two coats of black color, lined out with gold strips and finally varnished.

Testing.—Each locomotive to be fitted up and tested under its own steam before shipment.

Materials.—All materials to be manufactured according to the Chinese Government Railway Specification or builder's material specifications. Builder's workmanship and Inspection specifications to be applied.

Inspection.—The whole of the material and workmanship to be approved by the Inspecting Engineer appointed by the Ministry of Railways.

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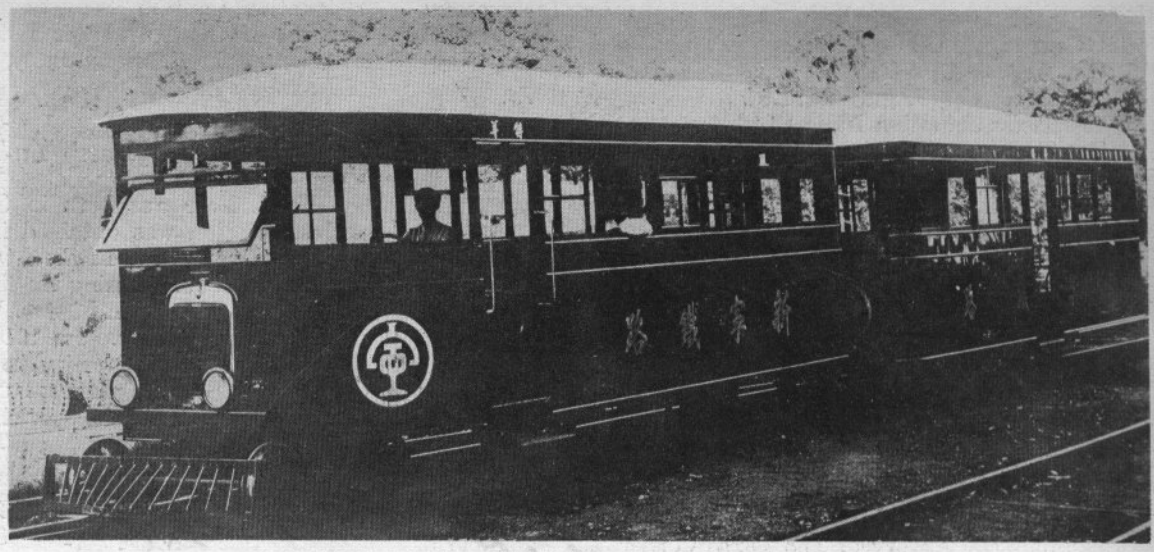
A CLEAR CUT ISSUE
STAY OUT OF IT
WHO PAYS THE BILL?
CHINA, THE NEW WORLD POWER
BACK TO SLAVERY

Vol. XXVII | NOVEMBER, 1931 | No. 11

Motor Rail Cars in China

Trade Commissioner,
A. VIOLA SMITH,
Shanghai



DEPARTURE IN RAILWAY TRANSPORT IN CHINA

On Feeder Lines to the Sunning Railway in South China, Engineers have constructed Bodies on Dodge Chassis. These have been in operation since August and are working very satisfactorily

MOTOR rail cars have been used to a very negligible extent in China. In Kwangtung Province the Sunning Railway has used several rail cars, and in Manchuria they are in use by both Chinese and Japanese railway lines. In central China this type of equipment is found in both the Shanghai and Hangchow areas.

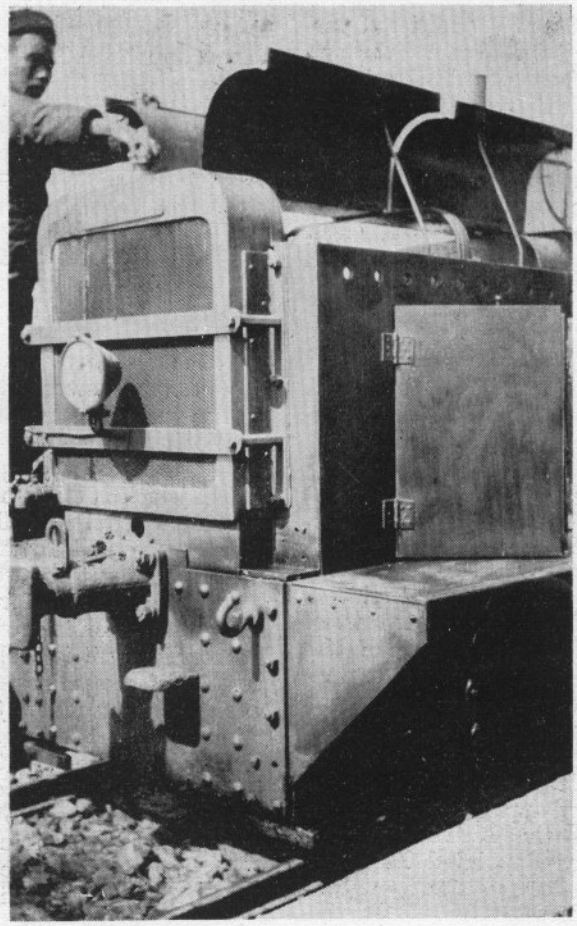
Equipment of the Shanghai-Chuansha Line

The Shanghai-Chuansha Railway, known as the Shanghai-Chuansha Transport Co., was started by private enterprise in October, 1925, with a capital of $300,000 Mexican. (One Chinese Mexican dollar is equivalent to approximately $0.2197.) It operates over a 21-kilometer (13-mile) stretch through a rural district in the environs of Shanghai; its Shanghai terminus is Chingningsz, a small village on the Pootung (east) side of the Whangpoo River, some six miles distant from Shanghai proper. In former days it was difficult to reach, as no regular ferry service was maintained and passengers were obliged to rely on native sampans for transport from the terminus to the Shanghai side. With the recent inauguration of a modern ferry service, this line has become readily accessible.

The Bureau of Public Utilities of the municipality of Greater Shanghai has developed a splendid ferry service on the Whangpoo River, placing in service four new ferries at a cost of $400,000 Mexican. Each boat can accommodate 40 first class, 160 second class, and 300 third class passengers. From Shanghai to Kaochao, 12 round trips are made daily, with intermediate stops at Szetoo, Chingningsz, and Tungkow. Through tickets are now readily purchasable at the Nanking Road Jetty to Chuansha, thus greatly facilitating the journey over this light railway from Chingningsz to Chuansha.

The Shanghai-Chuansha Transport Co. is reported to have 19 cars and four engines. The latter consist of two semi-Diesel engines, one gasoline engine, and one American tractor engine.

The company states that between four and five gallons of gasoline are consumed per engine per trip. The engines burning a semi-Diesel oil usually take four gallons per trip at a cost of $1.50 Mexican per gallon. Each engine pulls two cars at a time, each car accommodating from 24 to 32 passengers. Passenger cars owned by this company have a total seating capacity of 396 persons. First and second class accommodations are available, and about 680,000 passengers are carried annually. The width of the gage is one meter. Steel rails are laid on wooden ties with stone ballast between them.



Ruhrthaler Engine: Shanghai-Chuansha Railway

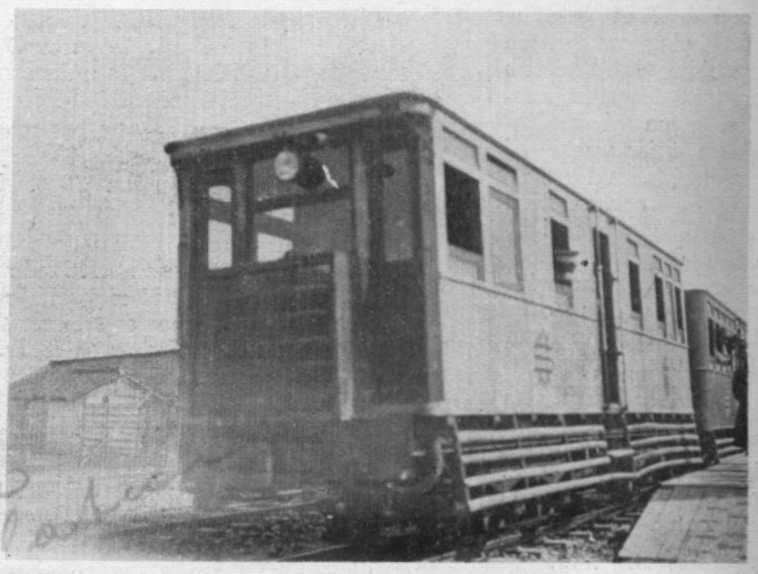
Shanghai-Nanhwei Line

The Shanghai-Nanhwei line, to the south of Shanghai, is also located on the Pootung side of the Whangpoo River. The company owns and operates a steam tug with lighters, as a ferry service between the Shanghai side of the river and Tungkiadoo, the Pootung terminus of the line. The railway is about eight miles in length, extending from Tungkiadoo to Chowpu. The company is now planning to extend the line from Chowpu to Sinchang, some 21 *li* (8½ miles) from Chowpu.

Two coal-burning steam locomotives of German manufacture serve this line from Tungkiadoo to Chowpu, and six passenger trains, with a total seating capacity of 320, complete the equipment. Passengers carried annually are reported to be about 600,000. The company owns four gasoline motor rail cars, one of which is now used on the short spur road from the opposite bank of a creek at Chowpu for a distance of about two-thirds of a mile to connect with a steamer for Nanhwei.

Both the Shanghai-Chuansha and the Shanghai-Nanhwei Railways are under the jurisdiction of the Bureau of Public Utilities of the municipality of Greater Shanghai (Chinese), to whom they are required to submit periodic reports. Copies of such reports must also be filed with the bureau of reconstruction of the district government in their respective localities. Originally each of these lines started as motor-bus companies—the Shanghai-Chuansha line with six busses and the Shanghai-Nanhwei line with four—but, owing to the heavy maintenance costs of the roadbeds, these companies decided to convert the roads into light railways. In 1926 the companies are reported to have been reorganized, and the introduction of light railways instead of motor-bus transportation was begun.

At the present time each of these companies seems to be strongly in favor



Motor Rail Cars on Shanghai-Chuansha Railway

of German equipment. However, if American manufacturers could effectively demonstrate to them the economic operation of motor rail cars they might be disposed to give American equipment a trial when future purchases are being considered.

Hangchow-Kiangshan Line

A light railway is now in course of construction from Hangchow to Kiangshan in Chekiang Province. Recently one motor rail car, built locally in Shanghai, was delivered to this line for use in its construction work.

The Hangchow-Kiangshan Railway has been projected to run from Hangchow, through the cities of Siaoshan, Chuki, Iwu, Kinhwa, Lanchi, Lungyou, Chühsien and Kiangshan, to Yushan, the latter being a few miles over the border in Kiangsi Province. Surveys have been completed for this entire route.

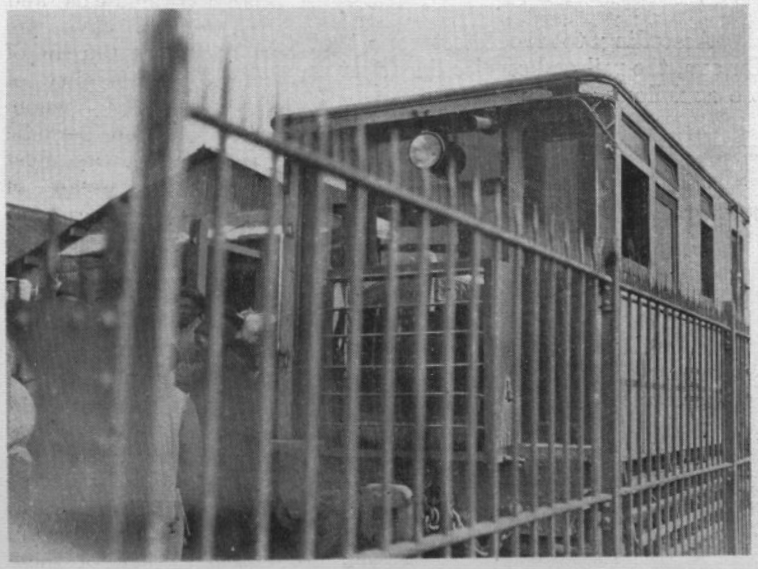
No actual construction work of any portion has been started until the financial provisions necessary for its construction and equipment have been fully completed. As a result of this careful planning of all parts of the project, the first 65 kilometers (41 miles) to Chuki were placed in operation on June first this year. Orders for track materials and rolling stock were placed with foreign mills many months ago and the first deliveries of this material for completing the line from Chuki to Lanchi (a further 133 kilometers) are expected to arrive in Shanghai in the current month. Tracklaying for this extension will start as soon as deliveries can be made to the present terminus at Chuki and will be pushed as fast as weather conditions will permit. The working schedule, which was prepared nearly a year ago (and which has proven so far to have been practically correct), provides for tracklaying to start at Chuki about the first of October and for trains to be in operation into "the famous ham country" late in the coming winter. The total line from Hangchow to Lanchi is 198 kilometers (123 miles) long.

The section of roadway to which your correspondent refers as causing concern is one of those minor occurrences common to most new railways. The track is being maintained (though in safety) rather close to the river bank, pending the further tedious cutting back of a rocky promontory. When completed, this section will be as free from danger from the river as any other section though its proximity to river and mountains adds to the scenic beauties of the line.

Sunning Railway

In South China the Sunning Railway has utilized motor rail cars with considerable success. The total length of the Sunning Railway in Kwangtung Province is 96 miles. In 1930 two 3-ton American motor rail cars with trailers were supplied to this railway. The rail cars with trailer have been successfully operated on the 22-mile stretch from Toishan to Pakshan and on the 20-mile route from Toishan to Kungyick.

In an article appearing in the motor section of the *North-China Daily News* last year, it was stated that this rail car made four return trips each day, carrying an average of 1,000 passengers per day. The gasoline consumption on this car was given as 7.4 miles per American gallon. As the Sunning Railway is using a Y-shaped track instead of a turntable to turn the cars around, and as they do not have a reversing transmission, the article indicated that a

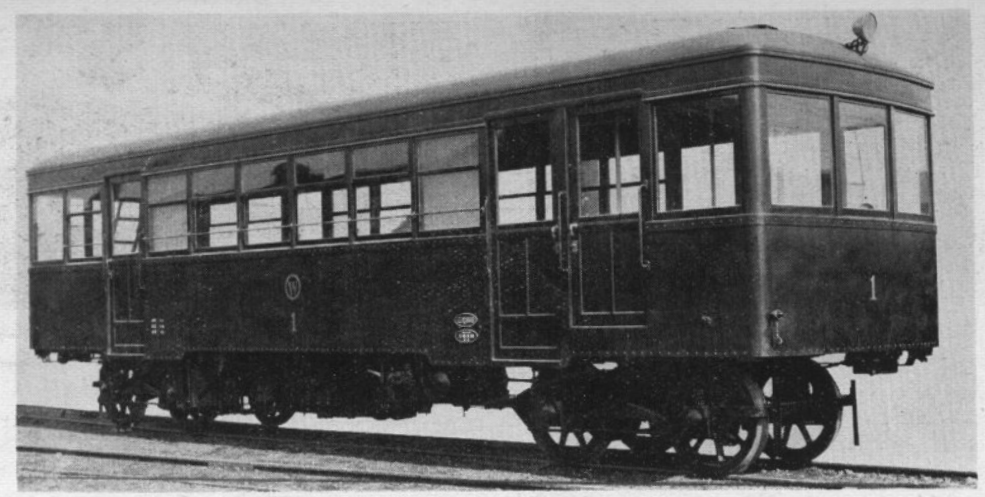


Chingningsz Station, Pootung: Shanghai-Chuansha Railway

good deal of gasoline was being wasted in switching the cars around. The consumption given above includes this waste of gasoline, and the correct consumption should be about eight miles per gallon.

One rail car with trailer operates over the 20-mile route from Toishan and Kungyick, carrying an average of 400 passengers per day. The gasoline consumption is about the same as that on the Toishan-Pakshan route.

In a recent report from Assistant Trade Commissioner Maynard regarding the operation of these motor rail cars by the Sunning Railway, it was stated that the railway had encountered some objections to the operation of these trucks from Canton officials, who felt that this type of transportation might retard the development of highways.



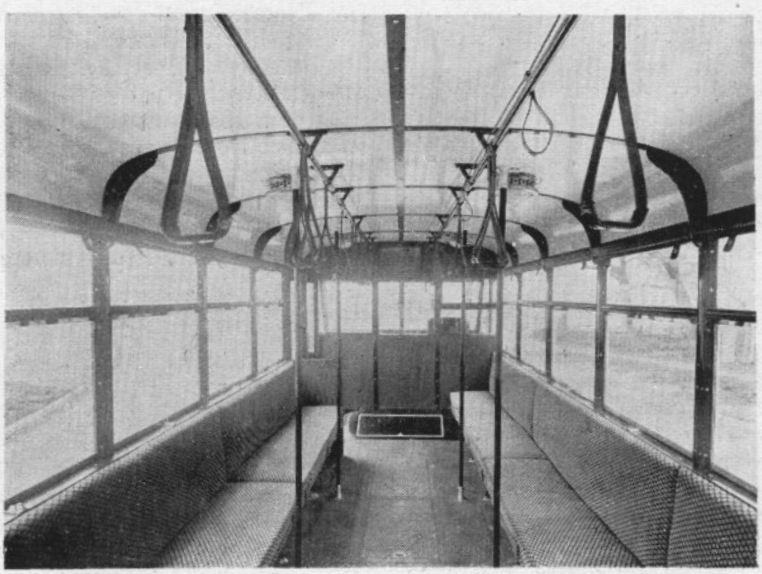
Gasoline Motor-car, Capacity 80 Persons for Ko-Jaku Railway, Manufactured by Kawasaki Sharyo Kaisha, Kobe

Motor Rail Cars in Manchuria

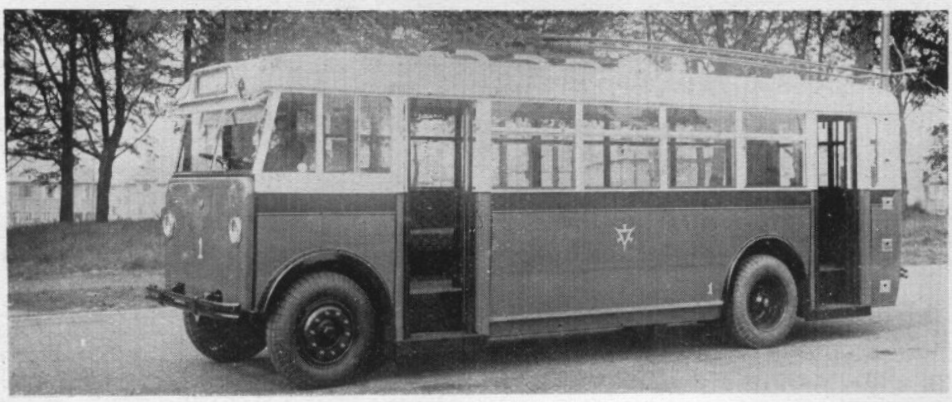
Motor rail cars for transporting passengers over short routes are in use by the South Manchuria Railway Co., according to Trade Commissioner J. J. Ehrhardt. A total of 17 cars, 12 of which are of 105-passenger and five of which are 50-passenger capacity, were purchased late in 1930. This equipment is of Japanese manufacture. They are equipped, however, with American motors and clutches, and other important parts also were purchased from the United States. Mr. Ehrhardt states that the railway company has found these cars very economical and is using them mainly for transporting school children. It is also indicated that 13 additional engines and parts for motor cars have been purchased. Construction of these cars will be done by the Shakako works of the South Manchuria Railway Co. at Dairen.

The small Buddha car is the standard specification of the Chinese railways in Manchuria—the L type, which carries six or eight passengers, according to Trade Commissioner Ehrhardt. Motor rail cars are used for the transportation of railway employees and railway police in time of emergencies.

Fragmentary information has been received to the effect that light American model cars, mounted on rails, have been utilized by the Chinese Eastern Railway for the transportation of railway employees.



Interior of one of the New Guy Trolley-buses for Kyoto



One of Kyoto's new Trolley-bus Fleet, Accommodation 70 Passengers, 35 Sitting and 35 Standing

Rails Motor-bus in Japan

Due to the decided superiority in simplicity of operation and cheap power production over the steam and electric car system, motor coaches on rails are gradually gaining their ground in Japan.

This is due to the initiative of the rural railway companies of minor standing which have recently been threatened with formidable competition from motor-bus service in the countryside, where traffic condition is light and infrequent trains or small trains meet all the requirements. Since these carriages equipped with internal combustion engines have proved themselves satisfactory, many railway concerns have placed orders for vehicles of this type in place of electrically driven or steam engined cars, and even the state railroad department has given a favorable consideration in this respect and now ten of these trains are under construction for trial in its car shop near Tokyo. When these cars are completed they are expected to be placed on the suburban and other minor traffic lines in Japan.

In this connection, the authorities are drawing attention of the private railway companies which are now operating their service with steam locomotive in comparatively short distance and of those who have been granted permission to inaugurate electric railway service in the country district, and are pointing out that the construction of steam or electrically operated traffic will lock up a considerable amount of capital and that the auto train proposition is more economical in many respects.

Used in Many Lines

According to the latest report of the Railway Inspection Bureau, the railroad service lines that are running these auto trains are as follows :

Ikasa Railway, Tomoe Railway, Mihata Railway, Shimotsui Railway, Mie Railway, Yokkaichi Railway, Yokohagi Railway, Osaka Electric Railway, Sangu Express, Bantan Railway, Kurate Railway, Enshu Electric Railway, Nakase Railway, Seien Electric Railway, and Kita Ena Railway line.

The typical features of those motor trains now used are :

RAILWAY PLANS LOAN.—Under the guarantee of the Daiki Railway Company, the Sangu Kyuko Electric Railway Company has decided to raise Y.10,000,000 loan shortly for which the Company will issue the debentures under the following terms: -

Total face value: Y.10,000,000
Interest: 5½ per cent.
Selling price: Y.99
Redemption: Within seven years.

No part of the issue will be placed on the market, the entire issue will be taken over by the 34th Bank and Mitsubishi Trust Company.

GIGANTIC CAR-BUILDING PLANT.—Preliminary work has been started on the construction of a large car-building plant in the vicinity of Tagi, with a productive capacity of 55,000 four-axle freight cars per year. The plant will turn out more railway cars per year than the production of all the existing car-shops in the Soviet Union put together.

The metallurgical base for the car-plant will be the new metal industries now being set up in Novo-Tagil. The car-building plant will begin operations by the first quarter of the year 1933.

RAILWAY ORDERS FROM CHINA.—The London Purchasing Commission of the Chinese Government have opened an office in London where they will deal with the disposal of the £3,500,000 representing part of Great Britain's share of the Boxer Indemnity Fund allocated to them. The greater part of this money will go to the purchase of British railway material for the Chinese railways, but the purchases will be spread over a considerable period as the duty of the Commission will be to deal with orders received from China. The British members of the Commission are Sir Basil Blackett, Sir Arthur Balfour, Sir Ralph Wedgwood, and Mr. W. T. Charter. Their first meeting was held a few weeks ago, but already one order for railway material has been received from China amounting to £300,000, and to fill this will be the first work of the Commission. The material required for this order covers a wide range, from a locomotive to a school. It is expected that the orders will include locomotives, passenger and freight vehicles, and a considerable quantity of steel rails and steel for bridges. Dr. Ching Chun Wang is the Director of the London office, which is in the building of the Federation of British Industries in Tothill-street, Westminster.—*Times Trade Supplement.*

TRADE AND FINANCE

SILVER PROBLEM.—An important conference is being called for September 22, in London, by the China Association to consider the situation which has arisen as a result of the fall in the price of silver. Leading men in commerce and in the mining industry will be present, the latter including Mr. W. Pellew Harvey, president of the Institution of Mining and Metallurgy. The conference will be presided over by Sir Robert Horne. In considering this subject it is important to remember that the purchasing power of countries in the East is seriously affected by the loss of credit that has resulted from depreciation in the value of savings which are in the form of silver metal, as was emphasized in the *Magazine* in February last. Base metal mining would also, of course, be given a considerable helping hand if the price of silver were stabilized at a higher price than at present.

CHINESE MACHINERY MARKET.—In the course of a recent report upon the trade situation at Shanghai, the Commercial Counsellor in that city states that there are many inquiries in the machinery market, but difficulties almost invariably arise with regard to the terms of payment. The high cost of machinery owing to the unfavorable exchange has led to the postponement of a good many projects. There can, however, be no doubt that the industrial development of China is making steady progress and if political conditions remain reasonably stable the demand for machinery should expand very rapidly.

"A noteworthy feature in the machinery business has been the strong efforts now being made by Japanese manufacturers to compete not only for the low-quality trade in which they have long been formidable, but also for the supply of equipment of a better type. There have, for example, been recent instances in which substantial orders for electrial supplies have been placed in Japan by the Shanghai Power Co., and whilst the Japanese tenders have been in some cases less than half those quoted by American and Continental manufacturers one is entitled to assume that they would not have been accepted unless they were fully in accordance with the specifications. It is difficult to believe that such contracts can be remunerative, but they are at least evidence of the determination of the Japanese machinery manufacturers to establish their position in the market."—*Electrical Review.*

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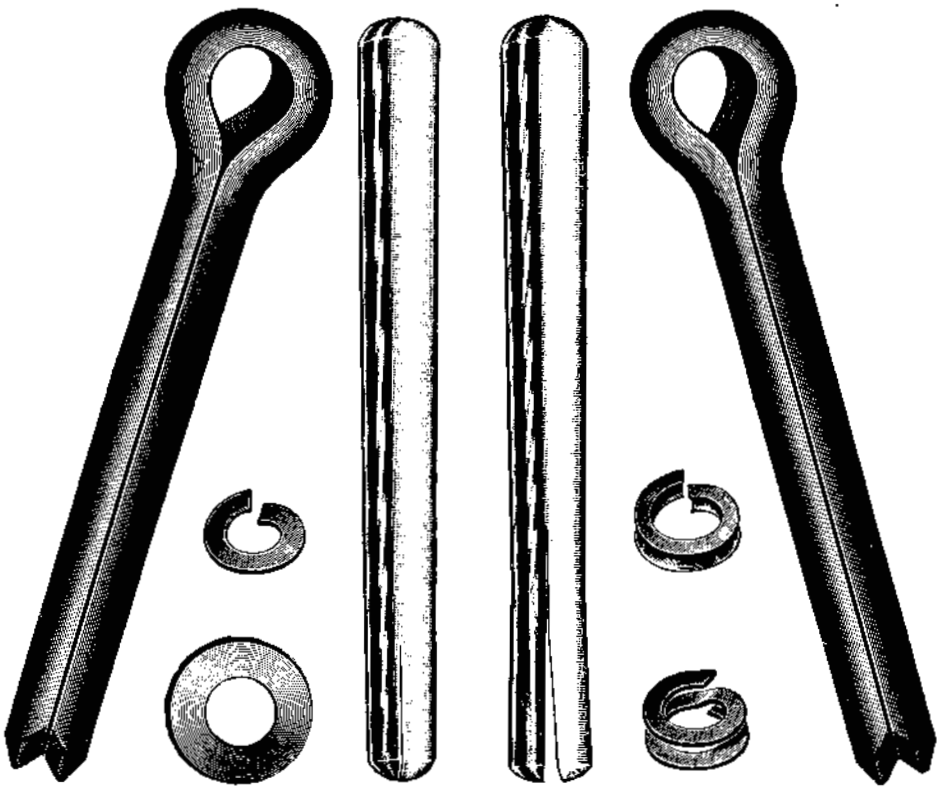

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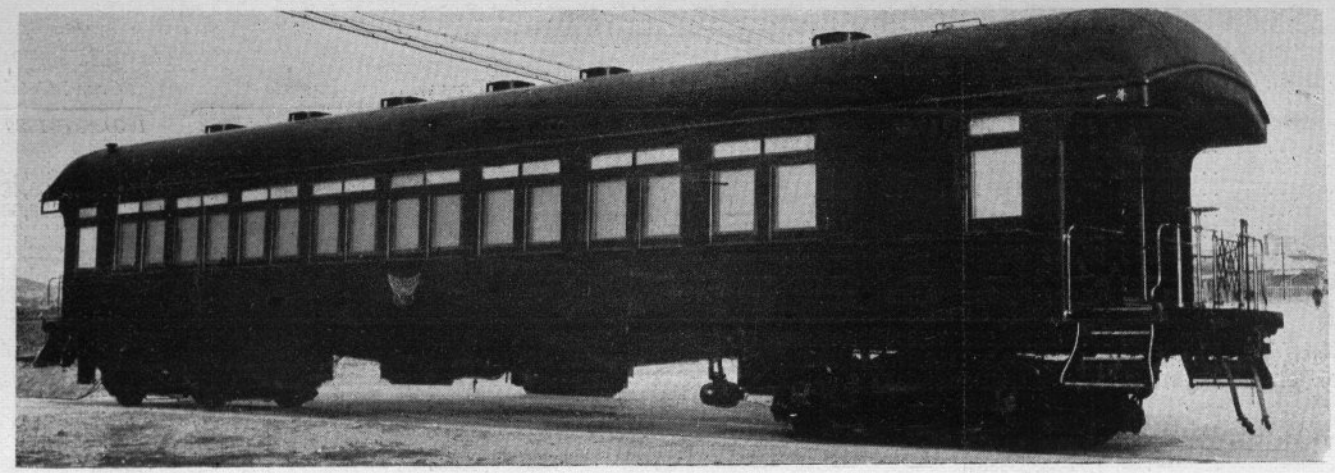
MILITARISM MUST GO !
DAYLIGHT IN MANCHURIA
THE TOUCHSTONE OF INTERNATIONAL MORALITY
THE RIGHT OF SELF-DEFENSE
THE CHINESE BOYCOTT

Vol. XXVII | DECEMBER, 1931 | No. 12

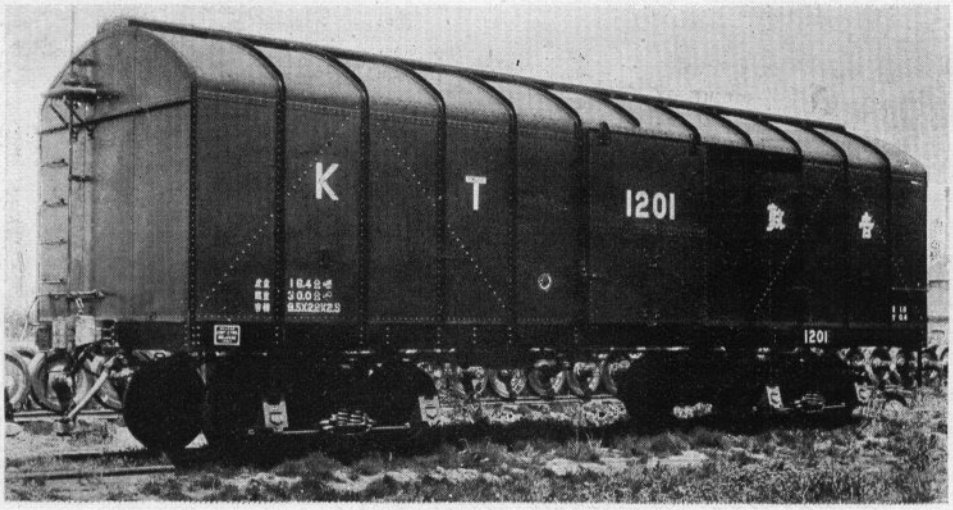


Composite First and Second Class steel passenger coach built for the Kirin-Tunhwa Raiway by the Dairen Engineering Works, Ltd.

Railway Equipment Market in Manchuria

Assistant Trade Commissioner LOUIS C. VENATOR, Tientsin,
and Trade Commissioner JOHN J. EHRHARDT, Mukden

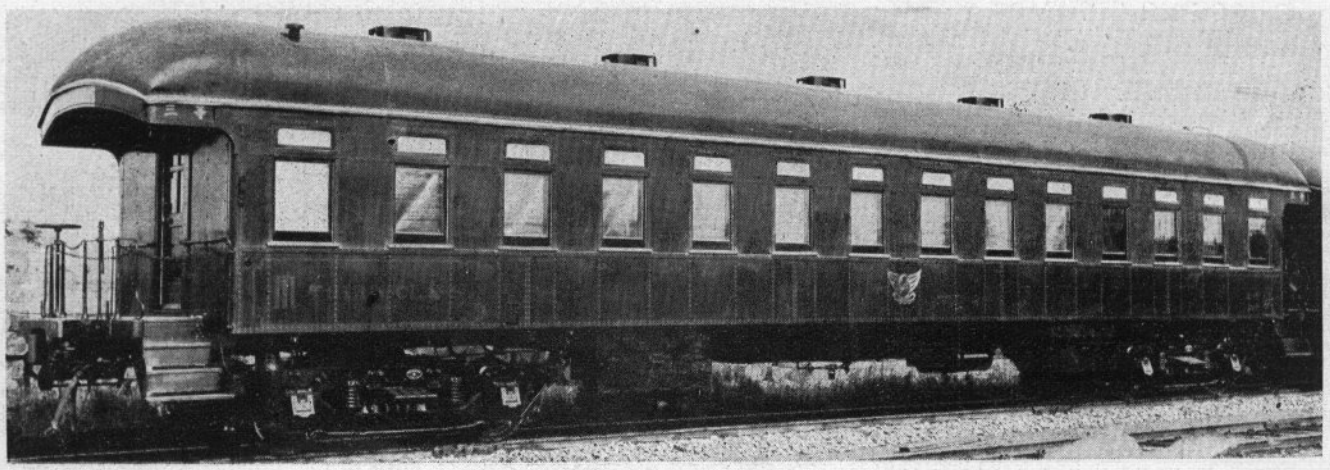
THE poor financial condition of North China railways during the first half of 1931 restricted their purchases of materials in most cases to absolute requirements, so that the total volume of such business fell considerably below the levels of the past two or three years. The only rolling stock purchased was 16 British locomotives for the Tientsin-Pukow Railway, bought with returned British Boxer indemnity funds, and four locomotives and one hundred 40-ton cars, obtained from the South Manchuria Railway by the Kiaochow-Tsinan Railway. The Peiping-Liaoning Railway was expected to open tenders for 20 locomotives in July, the funds to be advanced by North China banks.



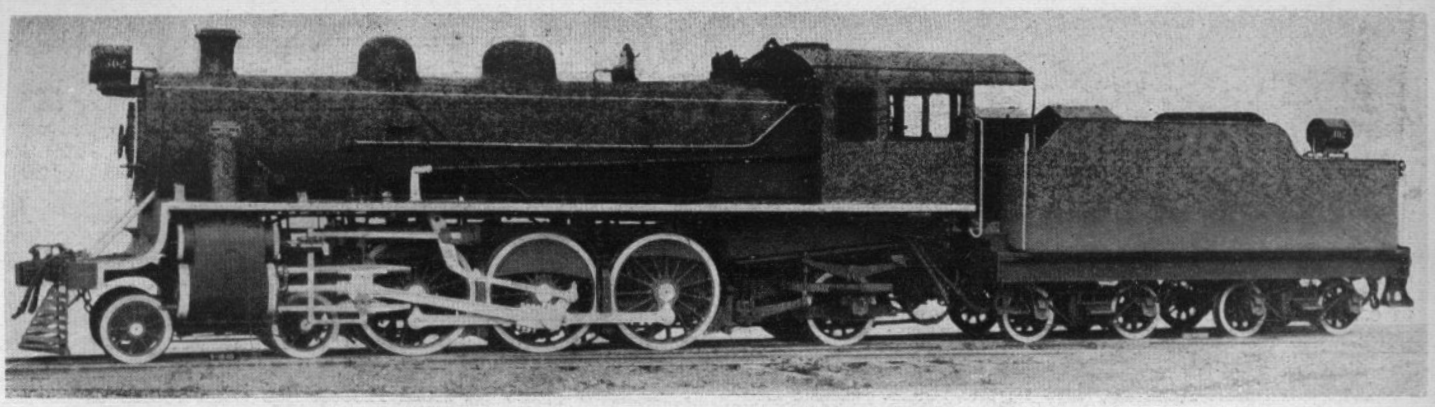
30 Ton All Steel Freight Car built for the Kirin-Tunhwa Railway by the Dairen Engineering Works, Ltd.

Factors Lowering North China Buying Power and Operating Efficiency

Rolling stock, roadbed, and other materials on all railways showed further deterioration during the first half of 1931. The Peiping-Liaoning Railway, financially the best situated in North China, suffered from a considerable amount of military traffic, from a division of revenues between the Mukden and Tientsin administrative offices, and from the necessity of making monthly payments (said to be $95,000) in gold currency toward the construction of a new port at Hulutao—a heavy burden under the depreciation in silver exchange since the signing of the contract.



All Steel Third Class Passenger Coach, built for the Kirin-Tunhwa Railway by the Dairen Engineering Works, Ltd.



Pacific Type Locomotive built for Kirin-Hailung Railway by the American Locomotive Company

As a result of these conditions, the Peiping-Liaoning Railway has been unable to make a number of purchases scheduled for this year, even canceling a number of contracts entered into late in 1930. Purchases for the Peiping-Hankow and the Tientsin-Pukow Railways were limited.

Operating schedules on all North China railways, except the Peiping-Hankow Railway, where through traffic was irregular as the result of military operations and the later floods, showed some improvement during the first half of 1931, particularly on the Tientsin-Pukow and the Peiping-Liaoning Railways, where through schedules from Pukow to Kirin were maintained most of the time. Nevertheless, it was generally felt that the amount of traffic resulting, particularly between Mukden and Kirin, did not justify the tying up of railway stock required in this through service. The Peiping-Suiyuan line continued only restricted operations as a result of serious lack of rolling stock ; this condition still exists, though some equipment was loaned by the Peiping-Liaoning Railway and some shop equipment was purchased that enables old cars and locomotives to be repaired.

Importation of Railway Materials into North China

Imports of railway materials during the first six months of 1931 were valued at 1,327,476 haikuan taels as compared with 647,416 haikuan taels for the similar period of 1930. This appearance of business improvement is somewhat misleading, however, as a large share of the articles imported during the current year were contracted for and purchased prior to January 1 ; the actual new business closed since that date has been considerably below the average maintained last year. The business done during the current year has been largely in metals, replacement parts, car furnishings, and a small amount of technical shop equipment.

Purchases of Rolling Stock by Manchurian Railways

Most recent purchases of rolling stock have been of local or European manufacture, on account of the difference in price. The shops of the South Manchurian Railway Co. and of another semi-private shop known as the Dairen Engineering Works have offered both locomotives and cars at prices considerably below those offered from Europe and as much as 20 to 30 per cent below American prices. In a recent purchase of 30 passenger cars, those made at Dairen were sold at prices which were approximately 75 per cent of the price of the lowest American offering.

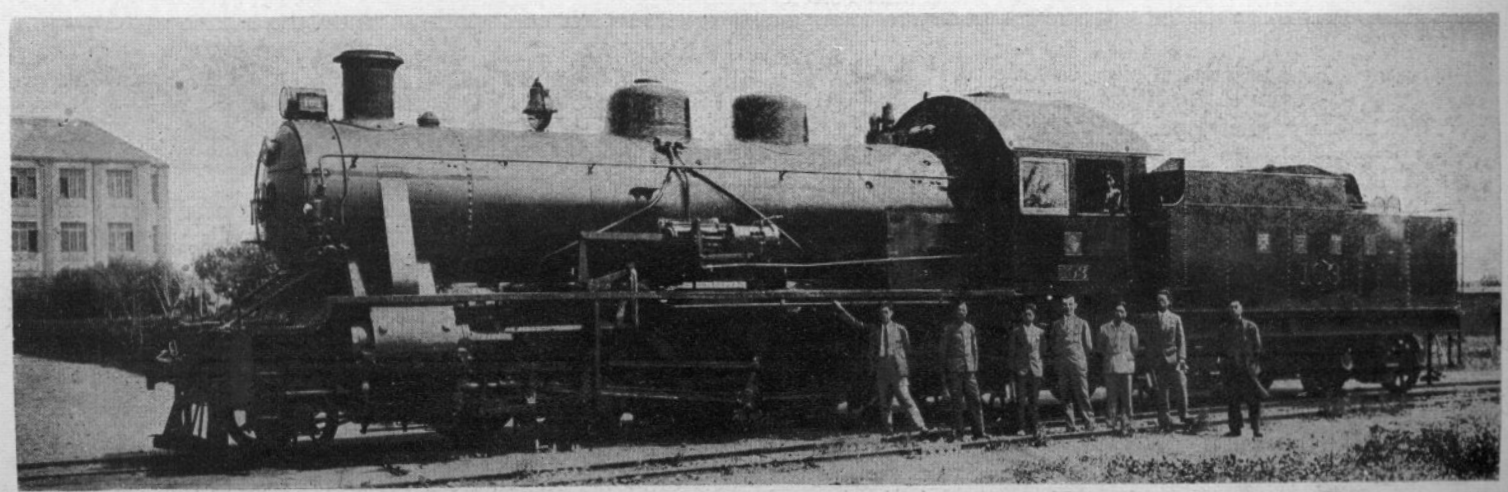
Czechoslovak manufacturers have furnished the bulk of the locomotive business during the past three years, at prices approximately 25 per cent below those offered from American concerns. These locomotives have not been in use long enough to give a definite statement as to their serviceability, but so far they seem to have met the requirements of the Chinese Government Railways. They have been supplied equipped with feed-water heaters and with a polished finish, both of which items have made quite an impression on the Chinese engineers.

Local Production of Equipment

Even though the railway shops of the Chinese Government Railways are lacking in equipment they have made considerable progress in the manufacture of parts and accessories, such as lubricators, injectors, air compressors, valves, fittings, car-heating equipment, and other equipment on which patents have expired. In one of the small Mukden shops some of these parts are turned out with only a few of the most elementary machine tools, 80 per cent of the work being accomplished by hand. Under present conditions the Chinese Government Railways have found it necessary to get along with the minimum of accessory equipment. The future market for high-grade equipment, however, should be better.

Besides the local output of cars and locomotives mentioned before, a development of considerable interest to importers of railway materials was the manufacture, or more technically the assembly, of a locomotive at the Tongshan shops of the Peiping-Liaoning Railway. Although many parts and patented appliances were imported, more parts were locally produced from imported materials than heretofore. This locomotive was put into service

(Continued on page 765)



Twenty-four of these 2-8-2 Two-Cylinder, Superheated, Standard Locomotives were supplied to the Tsitsihar-Koshan Railway by the Skoda Works of Prague.

The Mulin Coal Mine, Kirin

The Mulin coal mine is located at Mulin Hsien, on the upper reaches of Mulin River in the north-east of Kirin Province. It was an undeveloped district before the construction of the Chinese-Eastern Railway. After the completion of the railway and the operation of it for no more than three years, Mulin Hsien became one of the important market towns for food stuffs. It is 65 kilometers north of Hsia-chen-tze, 452 kilometers east of Harbin, and 331 kilometers west of Vladivoski on the Chinese-Eastern Railway.

The area of coal reserve of the mine is estimated at 28 sq. miles and 415 *mow*. The formation of the coal seams of the district divides the mine naturally into two groups. At present only the first group is under operation.

Only one seam of the first group of Mulin mine is under operation at present. It has a thickness of one meter and a length of 3,000 meters. The total amount of coal in this seam is estimated at 8,100,000 tons. The second group has also a thickness of one meter with a length of 1,600 meters with a total coal reserve of 7,695,000 tons. Calculated on the basis of producing 300,000 tons of coal a year, the mine can last for twenty-five years.

The composition of the coal is analyzed as follows : moisture 3.1 per cent, volatile matter 23.12 per cent, carbon 57.08 per cent, ash 16.10 and sulphur 0.6 per cent. The heating capacity is 6,600.

The Mulin coal mine has a very short history. Before the Revolution of 1911 there were a few native pits in the district. After the Revolution, a Russian was interested in the possibility of opening the mine and arranged with the Kirin Provincial Government to organize a company known as Mulin Coal Mine, a Sino-Russian concern, with the Chinese Government as one partner and the Russian merchant as the other. The Chinese Government gave the permit to open the mine and supplied a capital of $3,000,000. The Russian gave the same amount of capital and supplied technical experts. The total capital of the mine is $6,000,000.

The head office was established at Harbin. It was only in 1924 after a great deal of preliminary work together with a general survey of the coal deposits of the district was made that actual work at the mine was started. A total of 5,000 *mow* was purchased for the work and two shafts were started. The first shaft was operated under the direction of Russian experts and the second under the direction of Chinese experts. The railway which connects the mine with the Chinese-Eastern Railway was built in 1926 jointly by the Kirin Provincial Government and the Mulin Coal Mine Company. At the end of 1928 a total of 280,000 tons of coal were produced. The railway had a business of $44,500. The net profit of the Coal Mine Company of 1928 was $1,940,000.

The highest organ of the company is the Board of Directors composed of Chinese and Russian members. There are two directors (one Chinese and one Russian) and two managers (one Chinese and one Russian). All orders are to be executed in the name of the directors and managers. In the company there are four departments, namely, general affairs, secretariat, treasure, and technical departments. In the mine there are six offices, namely, mining affairs, railway affairs, machinery, treasure, engineering, and general affairs.

According to the figures of June, 1929, there were 35 people in the head office at Harbin, half Chinese and half Russians. In the mine there were 218 staff members, 107 Chinese and 112 Russians. Before the organization of the company in 1925 actual work was carried out for the production of coal in the district. One slide shaft, two perpendicular shafts, and seven tunnels were constructed. The length of the tunnels is 5,300 meters.

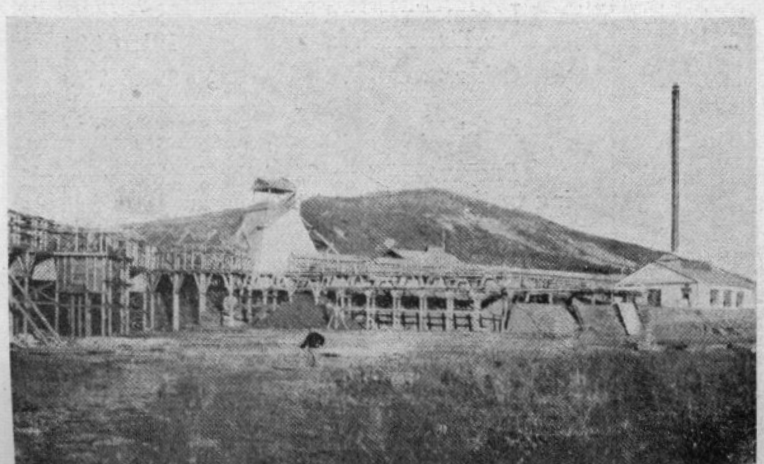
No. 1 perpendicular shaft : This shaft is located at I-hsia-chiu. Work on the shaft was started in September, 1925. Coal was produced first in April, 1926. The well has a depth of 38 meters, width of 2.2 meters, and a length of 4.8 meters. The machines of this shaft have a capacity of producing 700 tons of coal a day.

No. 2 perpendicular shaft : This shaft is 1,500 meters away from the first shaft. Work on this shaft was started in December, 1925. Coal was first produced by this shaft in September, 1926. The shaft has a depth of 51 meters, and the width and length are the same as that of the first shaft, with a capacity of producing 700 tons of coal a day. In addition to the two shafts described above, there are four small shafts for the purpose of sending in air as well as supplying timbering and other materials. The machinery for pumping air is located here.

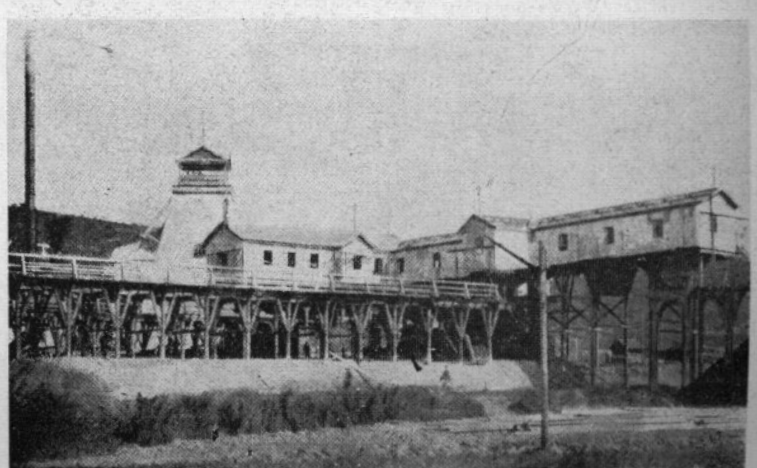
In 1928 owing to the great demand for coal and the prosperity of the company a project of expansion was considered. It was planned to build another branch railway of ten *li* to connect with the second group of the mine. It was also planned to open two more shafts. The total expenditure was estimated at $164,400. It was also estimated that in the first year after the completion of this new project a total 19,000 tons of coal can be produced. In the second year double of the amount can be produced. When the project was under construction the demand for coal was greatly decreased due to political reasons and the project was abandoned.

In order to discover more coal deposits in the district, much prospecting work has been done. It was discovered that between the first and second groups of the mine there is a seam of coal about one meter thick. This seam has an inclination which is beyond the tools of the company to determine. The company has five drilling machines for prospecting purposes with a capacity of reaching 80 meters. In 1929 a German drilling machine was purchased. The machine was made of steel with seven drilling heads with diameters ranging from three inches to nine inches. The machine can attain 250 meters underground. The total cost of the machine was Gold $13,000.

The main tunnel has a height of 1.8 meters and a width of three meters. The slide tunnels have a height of 1.8 meters and a width of three meters. The level tunnels have a height of 1.8 meters



Main shaft of Mine



No. 2 Shaft

and a width of two meters. The coal is dug out by man-power. It was only in 1929 that four digging machines were purchased from a German firm to substitute for men at a cost of $212 each. The tunnels are protected by timbering.

There are a total of 38,430 meters of single rail cars for the haulage of coal. The coal cars are of three kinds. The first is that of the Arthur Koppel model, German made with a capacity of one ton. There are 59 cars of this kind which were bought at a cost of $267.3 each.

The second kind is also German made. It is of the Grubenwagen model with a volume of 00.6 cubic meters and a capacity of .55 tons of coal and a weight of 300 grams. There are 200 cars of this kind in the mine which cost $247.38 each. The third kind of cars were made of wood by the company with a capacity the same as the second kind of German made cars.

There are two hoists, one at each shaft. The shaft has 85 h.p. and the boilers have a diameter of 2.75 meters and a speed of 2.5 meters per second at a capacity of 2,000 grams of coal. The cost of each hoist was $25,816.89. Another hoist was installed recently. It has 32 h.p. and the diameter of the boiler is two meters. The speed is 0.25 meters per second. A total of 660 tons of coal can be handled in 20 hours. The cost of the machine is Gold $3,201.25.

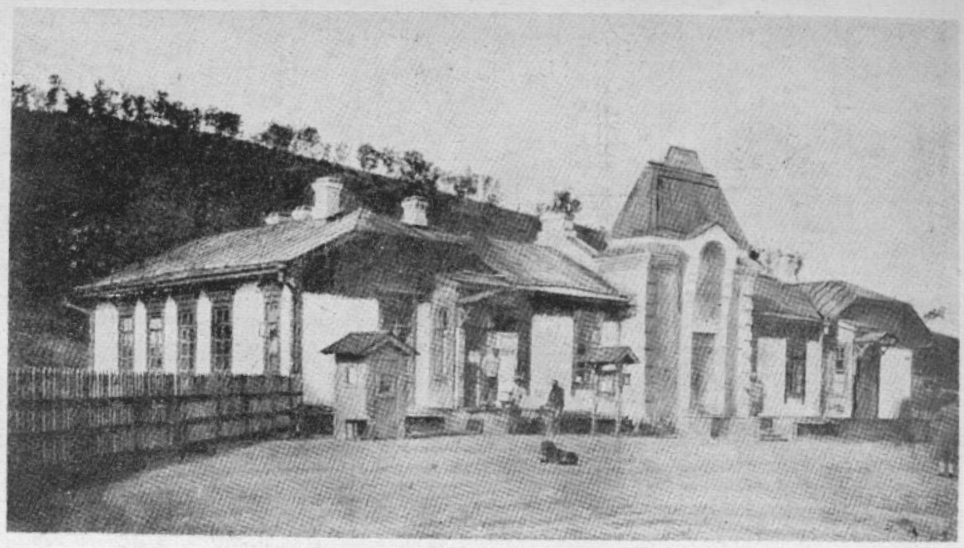
The machine for pumping water was supplied by a German firm. It pumps 43 to 46 times every minute. There are altogether four water pump machines at a cost of Harbin $2,444.13 each. In addition to these, there are another four Washington model pumps at a cost of Harbin $802 each.

In the mine there are four machines for pumping in air to the tunnels. Two of these are Japanese made and two are German made.

In the tunnels there are five kinds of lamps in use, namely, candles, oil lamps, acetylene lamp C_2H_2, electric lamps, and safety lamps. There are 250 Wolf safety lamps at a cost of Gold $1.87 each. There are another 250 safety lamps of another model at a cost of Gold $1.95. There are 5,000 glass safety lamps at a cost of Gold $5.10 each.

PRODUCTION.—The production of coal in the mine is as follows :

Year	*1st and 2nd grade of coal*	*3rd grade of coal*	*Total*
1925 ...	... 52,295 tons	11,153 tons	63,448 tons
1926 ...	... 96,121	8,122	104,243
1927 ...	... 196,064	12,569	208,633



Offices of Mulin Coal Mine

Year	*1st and 2nd grade of coal*	*3rd grade of coal*	*Total*
1928 ...	... 256,925	24,112	281,037
1929 ...	... 92,647	11,570	104,217 (note)

NOTE.—The figure for 1929 is that of the first six months.

The mine has one central power house. It was installed by the Skoda Works. There are altogether eight boilers. The area of heat is 60 cubic meters each, pressure, 8.5, weight of the boiler 13,500 grams and the cost of each is Harbin $6,210. There are two machines for generators to produce electricity at a cost of Harbin $12,800 each.

Many other machines are used by the mine. The total cost of other equipment, not mentioned above, is estimated to be more than $19,333.

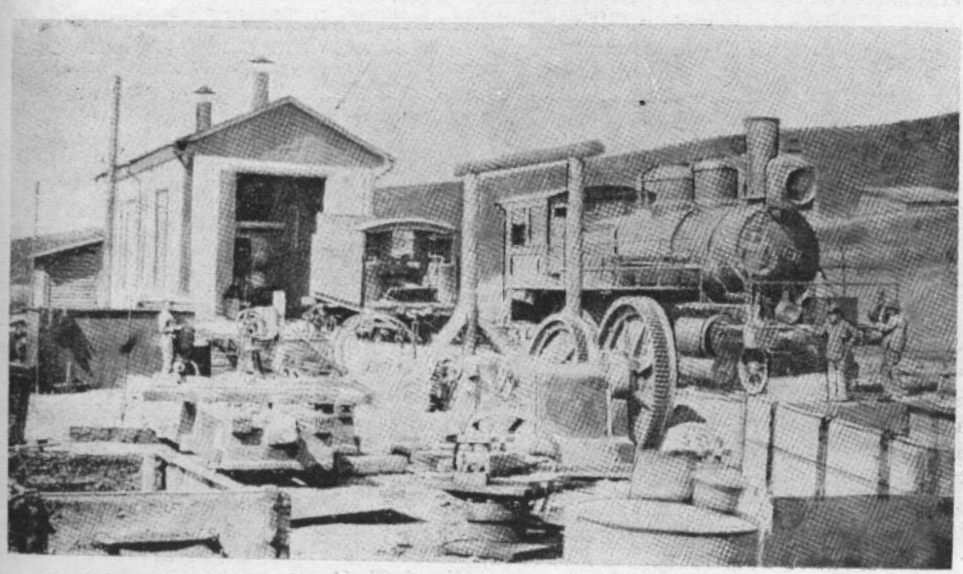
The mine depends on the Mulin railway to transport coal to other cities. The Mulin railway was built by the Kirin Provincial Government and the Mulin Coal Mine Company. A coal yard with machines for loading and unloading coal was built by Skoda Works and it was completed at the end of 1930 at a cost of 300,000 roubles. The railway connects the mine with Hsia-chen-tze station of the Chinese Eastern Railway. The locomotives and other rolling-stock of this railway were bought from an American manufacturing company at a cost of Harbin $191,734.84. The total number of pieces of rolling-stock is 30.

According to the report of the department of Treasure the assets of the Company, on January 1, 1929, were as follows :

Land and buildings	Harbin	$2,460,116.76
Machinery ...		188,760.84
Locomotives and rolling-stock ...		191,734.84
Others		322,887.73
Total		$3,163,500.14

PROFIT.—Net profit of the Company according to the department of Treasure is as follows :

Year	*Net profit from :*	
1924, 1925 ...	coal	$65,072.74
1926 ...	coal	263,391.65
1926 ...	railway	119,948.63
1927 ...	coal	879,338.63
1928 ...	coal	1,505,678.05
1928 ...	railway	445,038.82
Total ...		$3,612,772.06



Locomotives of the Mulin railway

Engineering Notes

INDUSTRIAL

YAWATA WORKS ENLARGES.—In line with the policy of the Tokyo Department of Commerce and Industry for a positive industrial development and for checking imports of various commodities, the Yawata Iron Works, the powerful government establishment, has decided to increase its tin plates production from the present annual amount of 20,000 tons to 50,000 tons. According to a reliable report that Yawata Iron Works is making arrangements with the Deposits Bureau of the Department of Finance for funds required for the proposed extension plan. This extension in the iron works, it is said, will save some Y.6,500,000 annually for the nation, estimating that the nation imports 50,000 tons of tin plates each year at the price of Y.172. Based on the prevailing market prices, the cost of tin required for 1 ton of tin plates is set at 42 yen.

CONSTRUCTION IN KUZNEZK.—The construction of the giant of the Soviet metalurgical industry, the Kuznezk, works, can in the main be considered as completed. A number of large constructions have been completed as, for instance, the water-supply system, solving the problem of supplying with water not only the Kuznezk works, but also the immense coal region of the Kuzbass-Prekoffieval. Another lately completed construction shall be mentioned: 5 powerful blowing engines, intended at the same time for the needs of works to be constructed in second place. Much work has been done in regard to railway construction, 120 Klms. of railways being built in that area. The second in importance is the coke department, doing a very complicated and responsible work. The main part of its construction has been completed and the coke furnaces are ready for drying. The construction of the first blast furnace shop is also completed. The water supply system for this shop is almost ready. The construction of the Marten shop is fully under way. Foundations are laid for ten furnaces, although four only were provided for in the schedule of constructions of first importance.

FOR CHINESE STUDENTS. To assist Chinese graduates of technology in obtaining practical training in engineering works and factories abroad, special arrangements for the admission of such students will be made with foreign companies abroad whenever any government organ places heavy orders for machinery or equipment with them. It is understood that owing to the world trade depression, it is not easy at present for Chinese students to acquire practical experience in engineering works abroad. The Executive Yuan has approved a joint petition submitted by the Ministries of Communications and Industry recommending the above procedure to enable a selected number of Chinese technical graduates being placed in factories and workshops abroad for a limited period of practical training. —*Kuo Min.*

The construction of additional modern primary school buildings of steel and re-inforced concrete is being planned by the City of Tokyo with an appropriation of Y.6,300,000, the period of construction to be spread over three years and a total of 22 new buildings. This will cover the second construction period in the school building program since the great earthquake of 1923. The first construction period ended last year with the completion of 117 steel and concrete school buildings to replace those destroyed in the catastrophe and 19 erected to replace old wooden structures. The second construction period is part of an extensive building program which calls for the replacement of 69 primary schools, which are old wooden structures, with more modern accommodations. The funds will be raised by a long-term loan which will mature on March 31, 1956. The expenditure will extend over three years, Y.909,259 being set aside for the next fiscal year, Y.2,534,820 for the following year and Y.2,722,491 for the fiscal year 1934.

KALLANG BASIN SCHEME.—An indication that work on the Kallang Basin scheme is to be proceeded with at once is contained in the notice issued by the Resident Engineer, Aerodrome, inviting tenders for the construction of temporary buildings at Paya Lebar (including coolie lines for 1,000 men), for excavation and transport of earth filling from Bidadari Quarry site to Kallang Basin, and excavation of earth filling at Paya Lebar Quarry.

NEW HONGKONG RESERVOIR. A new reservoir, with a capacity of 19,000,000 gallons, is nearing completion on the Kowloon side of the bay in the Colony of Hong Kong. The width of the dam in 400 feet, and the height 110 feet. This is one of the largest undertakings in progress in South China at the present time. Work is being carried out by a Chinese firm, with an American manager. This company is the only one in the colony that uses machinery to any extent in its construction activities. Most of the local contracting companies employ hand labor extensively and have little modern construction equipment at their command.

DUTCH BREWERY.—Preparations have already begun for the building of a brewery in Batavia by the Archipelago Brewery Co. The building is expected to be finished in the course of next year and before the end of 1932 the first beer will be ready for delivery. The company has also acquired sites in Singapore, Medan and Sourabaya for building other breweries. Building has already begun in Singapore.

MAKING PETROL IN JAPAN. A foreign correspondent reports that one of the members of the Technical College of Osaka has devised a method of producing petrol, or, in fact, two methods. Mixing a quantity of crude petroleum with 10 per cent. of catalytic charcoal and 2 per cent. of other products of a chromic basis, is allowed to stand for chemical reaction for 24 hours. The clear quantities are then separated and neutralised by alkaline soda and washed with water, afterwards dehydrated by calcium chloride. To the result 25 per cent. of alcohol is added with 1 per cent. of acetone. This treatment results in a petrol of about 90 per cent. of the crude that has been treated, and in quality is equal to the petrol spirit obtained by "cracking." The second method starts from alcohol (of which large quantities can be had from the sugar refineries) to which refined petroleum (kerosene presumably) is added with "carbon actif." But full details of this method are not yet disclosed, although said to have been fully worked out at Tokio, and the patent bought by Mitsui & Co.

RAILWAYS

TO EXPLOIT MINES.—With the approval of the Ministry of Railways, the Kiaochow-Tsinan Railway Administration will undertake the exploitation of the coal mines in the various districts along the Line. A technical expert from the Ministry has arrived here to inspect the areas having mineral deposits. Owing to the huge quantity of coal used by the Railway, amounting to about 140,000 tons annually, the Railway authorities believe it will be more expedient to provide their own sources of supply.—*Kuo Min.*

TO OBTAIN LOAN.—The South Manchuria Railway Company will obtain loans from the banks' syndicate to an extent of some Y.16,000,000, with which money the Company intends to redeem the promissory notes outstanding. The amount which was required by the Company first was Y.20,000,000, but the amount of the loan has been reduced to Y.16,000,000, being unable to obtain sufficient funds due to the tightness of the money market. According to the conditions for this loan, although they are not yet made public, the S.M.R. may pay 2 sen interest per Y.100 per diem. The Company will draw a 60-day sight bill for the loans and will renew the bill in case that the redemption is impossible.

NEW RAILWAY BRIDGES.—The Nanking Ministry of Railways has bought 2 iron bridges of 20 kilometers and 2 of 10 kilometers to replace the old ones along the Peking-Hankow Line.

LUNGHAI RAILWAY OPENS. Train service on the extension line between Lingpao and Tungkwan on the Lunghai Railway is being opened according to a responsible officer of the Railway Administration here. Construction of the Lingpao-Tungkwan extension line of the Lunghai Railway began in 1927. Construction work along this section of the railway has been most difficult due to the irregular geographical conditions. This part of the country abounds with mountains and rivers, and the new route of train service will run through tunnels and across bridges. The two most outstanding bridge structures along the extended line of the Lunghai Railway from Lingpao to Tungkwan are the two bridges, one over the Shih Erh Li River "Twelve Li River." The other bridge is at Shoutichen, northwest of this Twelve Li River. After the opening of train service between Lingpao and Tungkwan, the construction of these two bridges will continue. It will take half a year more to complete the finishing touches to these two bridges, according to the railway officer.

HARBORS AND SHIPPING

HARBOR RECONSTRUCTION. Director Wilhelm Sieveking of Hamburg will be the German expert, with English and French colleagues, to China to report on Harbor construction in Shanghai, in accordance with the invitation of the Nanking Government to the League of Nations.—Reuter.

INVADES AFRICAN WATERS.—The Ishihara Sangyo Kaiun Goshi Kaisha (a shipping company established by the Ishihara Industrial Company), which has strongly competed with the Java Conference since March this year in the operation of its liners between Japan and the South Seas, will shortly commence activity in African waters. It is reported that an agreement for cooperation has recently been reached between the Company and the K.B.M. Line, one of the leading Dutch companies. According to the plans of the Company, its ships are to carry cargo for ports in East and South Africa. The Erie Maru, which is to sail from Kobe on November 21, will carry cargo for Mauritius Island in the Indian Ocean. The cargo will be transhipped at Batavia by K.B.M. liners, which are plying between Batavia and African ports. The freight rates on leading commodities are as follows: Y.50 for silk goods, Y.38 for cotton goods, Y.38 for general dry goods, Y.35 for glass and low price sundry goods.

JAPANESE SHIPPING SUFFERS. Thousands of hands have been thrown out of work and losses aggregating $100,000,000 have been sustained by Japanese shipping companies largely as a result of the present anti-Japanese movement, according to reports emanating from Chinese sources. The set-back to Japanese shipping in China, it was reported, has been followed by a petition from the Seamen's Union in Kobe to the Japanese Imperial Government for financial assistance in what was termed a serious crisis. The report went on to state that the gold depreciation, decrease in freight and passenger revenues and other factors have contributed to the present state of Japanese shipping in China besides the boycott. A number of Japanese coastal and other vessels have suspended sailings temporarily at least, owing to the acute diminution of freight.

Volume XXVIII

January 1932
New Railway in Chekiang A short report about the completion of the Hangchow-Chuki (杭州-诸暨) division of the Hangchow-Kiangshan Railway.
Engineering Notes:-
Buying Equipment, The Ministry of Railways had officially announced the purchase of a large order of railway equipment from Britain.
To Complete Railway, The Ministry of Railways had announced their latest plan for constructing the uncompleted section of the Canton-Hankow Railway.

February 1932
Diesel-Electric Locomotive for Manchuria A short description of a new German diesel locomotive built for the South Manchuria Railway. 1 photo
British Locomotives for China Report that six 2-8-2 ("Mikado" type) engines built by the N. British Locomotive Works had been put into service on the Peiping-Liaoning Line
Engineering Notes:- Buys Equipment A report that Dr. C Wang of the Chinese Purchasing Commission had returned to London in connection with continuing purchase orders for British railway equipment.

March 1932
The Railways of China An editorial summarizing the state of China's railways following their falling into "a state of chaos" during the Warlord era. The report continues with a description of the current 15 separate railway administrations and the hope that they might be united and rehabilitated.
Engineering Notes:-
Central China Railways : The Hangchow-Lanchi (*Lanxi* 兰溪) railway was expected to be completed by the end of the month.

April 1932
Hangchow-Kiangshan Railway A summary of the construction progress on the Kiangshan (江山) line which had now reached Lanchi (*Lanxi*). Plans were in hand for the second section to Yushan (玉山).
Extension of the Lunghai Railway A summary about the completion of the Linpao to Tungkwan section. (a repeat of reports covered in 1931 editions)

May 1932
Kiaochow-Tsinan Extension A number of new branch lines were being planned including the first from Tsinan (*Jinan*) to Taokow (道口 *Daokou*)

June 1932
The Canton-Hankow Railway : a repeat of earlier statements by the Ministry of Railways that this uncompleted line would soon be constructed.
Metropolitan-Cammell Carriage Works : a description of luxury carriages and wagons being built for various railways, including orders for China.
The Nanking-Pukow Train Ferry : an illustrated description of the train ferries and loading bridges being built for the ferry service between Nanking and Pukow. Several engineering sketches and a list of associated equipment ordered for the project from U.K.
New Railways will Aid Manchurian Development : An opinion written by a Japanese engineer on how Manchuria (then under Japanese puppet control) was in a much superior situation to develop ahead of 'China proper'.

Reconnaissance Survey of a Railway Line from Chungking to Kuangchouwan : an article by two Chinese surveying engineers arguing that a railway from the southern seaport port of Kuangchouwan (广州湾) to Chungking through Szechuan Province made more sense and had better financial prospects than the proposed Chengdu-Hankow-Shanghai railway via Chengdu. Their proposal would be 500 km shorter. 2 maps and several profile sketches of proposed route.
Engineering Notes:-
To Rehabilitate Route : The first priority for the rehabilitation of the Peking-Hankow Railway should be the repair of delapitated rolling stock according to the railway's Chairman.
Seeking Funds : the Minister of Railways was seeking a loan from Britain for the completion of the Canton-Hankow Railway

July 1932
Engineering Notes:-
S.M.R. Improvements :- The SMR had a plan for improvements costing £12 million over the next three years. [my note: this should probably read Japanese Yen (¥)]
Development of Poshan The Kiaochou-Tsinan railway planned to purchase the light railway from Poshan (博山) .
Railway in Szechuan : A Preliminary survey for the Chengdu-Chungking railway had been completed . The estimated construction cost would be $24million.
Canton-Hankow Railway : The Nanking Ministry of Railways was appropriate $100,000 a month for completion of the unfinished railway.

August 1932
Progress of Extension Work on Lunghai Railway : H.H. Ling, the Asst. Director provides a well-illustrated and detailed 5-page report describing the construction work on the uncompleted missing section of the railway. Several engineering sketches and photographs.
Engineering Notes:-
Lunghai Line Extension a brief note summarizing the work contained in the above detailed report.
Loan for Railway : Repeat report about a loan being sought from Britain for the Canton-Hankow Railway.
Trunk Railways Planned : the Central government was considering plans for the construction of three new railways connecting the southern provinces.

September 1932
The Metropolitan-Cammell Carriage, Wagon & Finance Company : a description of wagons & passenger carriages being built for various railways in China. Several photographs.
Engineering Notes:-
Rail Spikes for China : report about an order for 500 tons of steel rail spikes being manufactured in Britain for Chinese railways.
Light railway in Chekiang : short report about a proposed privately-funded narrow gauge railway from Wuhu (芜湖) to a new port at Chapu (*Zhapu* 乍浦) on the East coast.

October 1932
Hangchow-Kiangshan Railway An illustrated description of the completion of this line by Consulting Engineer Arthur M. Shaw. Several photos and map.

Engineering Notes:-
Ferry Launched : the first Nanking-Pukow railway ferry, under construction in Britain was almost ready for launching.
Loan for Railway : a financial loan for the newly completed Hangchow-Kiangshan Railway had been agreed.

November 1932
British Boxer Funds : a report summarizing the recent activities of the Board of Trustees for the Boxer Indemnity Fund. This includes a list detailing how two thirds of the funds being dispensed were destined for purchasing equipment for China's railways from British companies.
Engineering Notes:-
Buys Sleepers : A shipment of 200,000 wooden railway sleepers had arrived in Nanking from USA. These were for the Tienstin-Pukow Railway. A further order for 300,000 had been placed for the Peking-Hankow Line.
Chengting-Taiyuan Railway : Officials from this railway and French engineers were to survey for two new lines, the Shihkiachwang (*Shijiazhuan*g 石家莊)-Taku Railway , initially midway to Siaofan (*Xiaofan* 小范) & the Tatung (*Datong*) -Tungwan (*Dongguang* 东光) Railway

December 1932
Sunning Railway Bridge at Kung Yik, Kwangtung : illustrated report describing a new railway bridge being built across the Tam River at Kung Yik (Gongyi 公益) to replace an antiquated train ferry on the *Xinning* Railway (新宁铁路) . 3 sketches & 1 photo of existing ferry,

/continued on page 198

ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW

DEPARTMENT OF COMMERCE
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遠東時報

AGAIN, STAY OUT OF IT!
BASIC PROBLEMS
OUR FRIENDSHIP FOR CHINA
THE GREAT MISTAKE

Vol. XXVIII JANUARY, 1932 No. 1

3,034 kilo tons of rails. This is a total production of 37,809 kilo tons. So the balance of the billets produced was either carried on hand or sold in the market. No details are available.

This company has an authorized capital of Y.10,000,000 of which Y.5,000,000 is paid in. The presence of several Mitsui men on the Board of Directors, would seem to indicate that it is to-day controlled by the Mitsui group.

The companies given before are the Principal makers of bars. Besides them there are a large number of very small makers who produce bars usually from remelted scrap materials. But the total of their production is not at all important, from 1923 to 1929 the whole amount being only 68,350 tons, less than 10,000 tons a year.

The other makers listed on anot er page are all makers of special steels. These will be considered later.

Imports of Bars

The import of steel bars to Japan is now only about five per cent of the total annual production. Imports in 1930 were:

Round	22,524 kilo tons
Square	2,556
Flat	10,714
Total	35,794

Another series of figures published in the Yawata Steel Works, *Haibai Junpo*, makes this total for 1930, 37,097 kilo tons. This figure includes all miscellaneous shapes, etc., so it is probably more correct than the one given above.

In 1929, bar imports were 93,663 kilo tons, 15.7 per cent of the total domestic production. In 1928 they were 68,851 kilo tons, about 17.9 per cent of the total produced in Japan.

In the matter of import figures there are such differences between even the figures published by the Yawata Steel Works at different times, that in order to avoid all confusion in dealing with them, those used here are as given in earlier pages. But for reference the imports of bars by countries are given here, for 1929 and 1928 and 1927. The figures for 1930, are still not known.

Country of Origin	*1929*	*1928*	*1927*
		Kilo Tons	
England	7,026	5,211	9,795
France	11,828	5,478	1,082
Germany	42,796	23,010	43,789
Belgium	16,140	10,843	21,055
Austria	3,562	2,291	2,515
Holland	1,421	1,028	1,940
Sweden	1,506	1,543	1,930
United States	2,111	907	1,193
Kwantung Province	21	496	23
Others	220	305	37
Total	85,631	62,546	83,359

The following table showing the amounts of bars used in the different industries in 1928, is given here for what it may be worth. It is taken from *Seitetsu Gyo Sanko Shiryo*, of June 30, 1930.

Bars: Industry	*Round*	*Square*	*Flat*	*Miscellaneous*	*Total*
	Kilo Tons				
Railways: including electric ..	12,341	7,578	5,407	6,998	32,324
Building construction, and concrete reinforcing	234,603	9,872	19,460	1,478	265,413
Shipbuilding	16,088	3,017	6,265	2,180	27,550
Machinery making	47,333	13,535	26,858	59,261	146,987
Petroleum: Gas: and Waterworks:	3,905	96	556	10	4,567
Mining	8,604	2,682	3,563	50	14,899
Miscellaneous Industries ..	33,790	7,116	19,155	4,983	65,044
Total	356,564	43,896	81,264	74,960	556,784
Same figures for 1927 consumption:					
Railways	9,794	4,102	4,990	166	19,052
Building Construction ..	127,892	9,326	20,562	944	158,724
Shipbuilding	10,327	1,505	9,574	4,828	26,334
Machinery	36,582	12,394	27,758	927	77,661
Petroleum: Gas: and Waterworks	1,482	100	377	9	1,968
Mining	7,198	2,061	5,228	315	14,802
Miscellaneous	24,111	4,212	10,711	571	39,605
Total	217,386	33,700	79,200	7,760	338,046

(To be Continued)

New Railway in Chekiang

Completion of the Hangchow-Chuki division of the Hangchow-Kiangshan Railway marks a new era in the history of transportation in Chekiang Province, says the Chinese *Economic Bulletin* for it is the first railway penetrating the central and western sections. For hundreds of years people have been forced to travel by slow, clumsy, and uncomfortable sailing-vessels, or more recently in old-fashioned, always crowded, and very insanitary, river steamboats.

The construction of the line was proposed about two years ago by Mr. Chang Ching-kiang, ex-Chairman of the Chekiang Provincial Government, and work was actually begun in March, 1930. In order to keep down the cost it was decided to build a light railway, and the expense, to be borne entirely by the Provincial Government in monthly installments, was estimated at $6,000,000. On several occasions, however, work would have been suspended on account of financial difficulties but for able management, and early in June the Hangchow-Chuki section of the line, 65 miles in length, was completed, being opened to traffic in July. It is expected that trains will go as far as Lanchi, a business center 99 li from Kinhwa.

To avoid unnecessary expenditure, the organization of the railway staff has been made as simple as possible. The director of the railway is also head of the engineering department, while the vice-director is also head of the transportation department, which consists of two sections—traffic and mechanical.

Arrangements were made to draw $400,000 every month from the provincial treasury for 15 consecutive months from March, 1930, making a total of $6,000,000 for construction expenses. Owing to financial difficulties, however, the provincial government was unable to make regular advances, and consequently the work of construction was greatly delayed.

In regard to the general plan of construction, it is intended at first to build one siding at every station. In bridgework the understructures generally consist of wooden piles, although masonry and concrete are occasionally used. The superstructures are either Oregon pine logs or 18-ft. steel girders taken from the Shanghai-Hangchow-Ningpo Line. These girders rest upon 12-in. square timber piles driven in rows of five. At some crossings small span concrete arches are constructed. The bridge across the Tsim Shan Kiang, is the only one in which structural steel is extensively used. There are six girder spans of 42-ft. each in the center of this bridge, and each pier consists of two rows of Oregon pine piles, 70-ft. in length, and seven in each row.

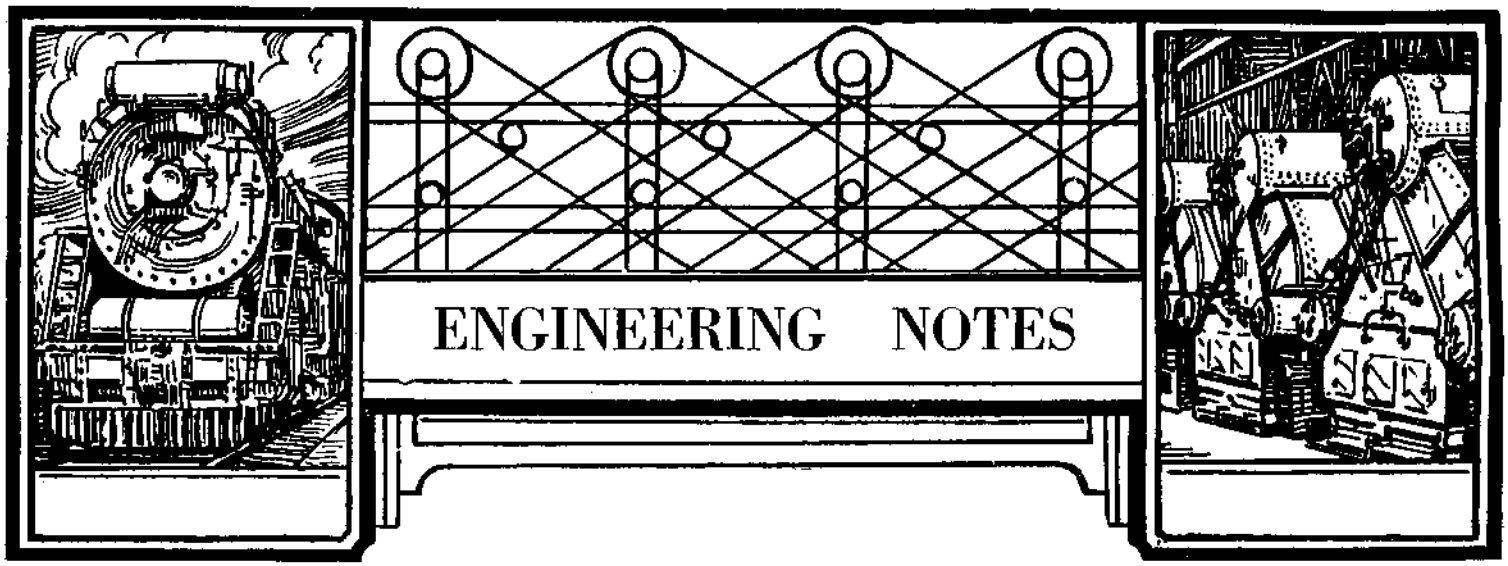
For the construction of platforms and sidings at stations rock excavation near Lanchi, track extension along the Tsien Tang River, a retaining-wall at Kinhwa, and the protection of embankments will be carried out later.

The railway owns three 2-6-0 type locomotives, six passenger-cars, two luggage-vans, eight open-cars, and two cattle trucks. The carriage-work is of Chinese make, the steel frames being American. Before the end of this year it is expected that six more locomotives, 24 frames of passenger-cars, 10 frames for luggage-vans, eight open-cars, and two cattle-trucks will be ready for use. According to the latest report by the Department of Reconstruction of the Chekiang Provincial Government, three additional locomotives and 20 passenger-cars will be shortly ordered from abroad.

Fares are fixed at 1½ cents per mile per passenger. The revenue of the Hangchow-Chuki section of the line is $500 a day, barely enough to cover construction costs of the remaining section of the railway. By the time the Chuki-Lanchi division is completed, however, it is hoped the revenue will increase to three times the present amount.

The railway authorities are planning a through traffic service in connection with the Shanghai-Hangchow-Ningpo Line. If this is done, the Hangchow station would have to be removed from Si-sheng to a point along the eastern bank of the Tsien Tang opposite Zakow, the terminus of the Shanghai-Hangchow-Ningpo Line, and four or five steam-ferries would be necessary to carry passengers and freight across the river.

For financial reasons, the Chekiang Provincial Government is inclined to make Kinhwa the terminus of the railway, building a modern road from that point to Kiangshan, on which highway passengers and freight could be carried by motor vehicles.



FINANCE AND TRADE

JAPAN ENTERS BRITISH MARKET—Japan is doing a thriving business in cheap rubber-soled boots and shoes. According to the South African Board of Trade, it became the leading supplier of the Union in 1930, exporting to that market no fewer than 1,441,689 pairs (valued at £92,585), compared with 81,934 pairs (at £6,174) in the previous year. It now exports to South Africa practically seven times the quantity of rubber shoes that Great Britain ships, though in 1930 the United Kingdom was the second largest exporter to Japan.

Urgent representations were recently made on the subject to the Board of Trade in the Union by the footwear and leather industries. The contention of the manufacturers is that a large proportion of the increased imports has displaced, and is still displacing, South African made leather footwear of the lower price type, such as whole cuts, sandals and veldskoons.—*Evening Standard*

PUBLIC WORK

SURVEYS IN CHINA.—A third survey party organized by the Huai River Conservancy Board has gone to Huaian (Tsingkiangpu), where surveys will be undertaken in preparation for repairs to the dykes along the Huai River. In this connection it is understood that the National Flood Relief Commission will employ refugee labor for the work as part of its scheme of relief, recruiting 20,000 refugees who will receive food and clothing besides wages. In accordance with the National Government's decision to develop the port of Haichow, a survey party under the leadership of Messrs. Hsu Pch-kuei and Chiang Li-sheng, engineers, arrived at Sinpu, a suburban town near Haichow and is proceeding to Hsukou where the proposed Haichow harbor will be located and where the party will commence their surveying work.—*Kuo Min.*

COMMUNICATIONS

NEW TELEPHONES.—The installation of new telephones at the rate of 23,000 a year is being planned by the Japanese Ministry of Communications, the extensions being carried out on a large scale at an expenditure of Y.130,000,000 to be raised by bond issues extending over 10 years. This plan was drawn up following the discovery that the undertaking can not be entrusted to private enterprise without a Government subsidy, according to the *Jiji Shimpo*. Whether the Government will sanction the scheme remains to be seen. In this connection it may be recalled that the establishment of a semi-Government telephone corporation was rejected by the Government when the matter was brought up last year. Other Government undertakings to be covered by the floatation of bonds includes the organization of bus feeder lines by the Ministry of Railways planned by Dr. Tasuku Egi. The plan is now held up due to the illness of the Minister but will be pushed to completion as soon as Dr. Egi's health improves.

BUS SERVICE STARTED.—It is learned that a motor bus service linking up Tihwa, the Sinkiang provincial capital, with Kalgan, the Chahar provincial capital, will shortly be inaugurated. Trial motor trips conducted between the two cities have proved satisfactory. When the service is in regular operation, a trip which now takes nearly a month may be effected in only 10 days. A consignment of ten motor buses ordered by the Sinkiang Provincial Authorities are on the way to Tihwa from Kalgan.

RAILWAYS

SIAMESE RAILWAYS.—The contract for the supply of points and crossings required by the Royal State Railways of Siam has been awarded to Messrs. Thomas Summerson and Sons of Darlington, England, at a price of £10,693.2-6 c.i.f. The contract for 1,000 tons of steel rails has been awarded to the same firm at a price of £10-12-0 per ton c.i.f.

BUYING EQUIPMENT.—British reports say. The Chinese Ministry of Railways officially announces that the purchase of a large quantity of new equipment is contemplated, most of which will come from Britain.

The total order will be :

119 locomotives.
114 passenger coaches.
587 goods wagons.

The announcement does not state the method to be adopted for payment to British manufacturers, says the *British United Press*. In January it was announced that the Chinese Government had agreed to spend £3,000,000 of the Boxer Indemnity on British railway equipment for the rehabilitation of the Chinese railways, and it is possible that the new order may come under this agreement. A supplementary report says. The Chinese Government Purchasing Commission have placed contracts for sixty 40 ton all-steel covered waggons with the Metropolitan Cammell Carriage, Wagon, and Finance Co., Ltd., of Saltley, Birmingham, and for sixty open-type waggons with Messrs. Hurst, Nelson & Co., Ltd., of Motherwell, Lanarkshire (states *Modern Transport*). All the waggons are required for service on the Tientsin-Pukow Railway.

TO COMPLETE RAILWAY. It is reported that the Ministry of Railways has formulated a plan for completing the uncompleted section of the Canton-Hankow Railway, linking South China with the Central China provinces. The latest scheme provides for the building of the Shiuchow-Lochang section of the line within seven months. It is understood that the project will cost £170,000, and from the British Returned Boxer Indemnity Funds. In a statement made to the press, Mr. Yeh Kung-cho, Minister of Railways in the Sun Fo Cabinet, said that the new Government planned to carry out by stages Dr. Sun Yat-sen's Railway Development Scheme, which provides for the building of 100,000 miles of railways in China.

AVIATION

NEW SOVIET AIR LINES.—An extension of the airmail line Moscow-Irkutsk to Vladivostok is provided for in the program for 1932 of the Civil Aviation Administration. Under this program, 47 new air-lines, aggregating 11,000 miles, will be opened in the Soviet Union in 1932. Of these the new Irkutsk-Vladivostok line is one of the most important. According to the official announcement, mails between the capital and the Pacific seaboard will in future take only five days to reach their destination with an additional day for mails from and to Central Europe *via* the Moscow-Berlin line.

WANTS BRITISH AERO-ENGINES. The Japanese Government, says The *Glasgow Herald*, has opened negotiations in this country for the supply of a number of 825 horse power aircraft engines for installation in her flying boats. Many of Japan's seaplanes already carry British engines, but the type which is now sought would so increase the speed of her 'planes as to rank them with the fastest Service machines in the world. Mr. A. F. Sidgreaves, managing director of Rolls Royce, who spoke of the inquiries which had been made from Japan, said that while the skeleton flying boats would be built in Japan according to Japanese design, the engines, if the deal is completed, would be constructed in this country and installed in the 'planes by British workmen who would be sent to the Far East for that purpose. The inquiry, he suggested, pointed directly to Japanese appreciation of recent advances in aero-engine design and their determination to keep abreast with the rest of the world.

SHIPPING

SOVIET OIL FOR CHINA.—The third tanker with a consignment of Russian oil and gasoline for Shanghai left Batum early in January, according to a report published by the *Eskonomitcheska Shisn*. The tanker, a Norwegian vessel, is carrying 10,000 tons and is expected to reach Shanghai next month.—*Trans-Ocean Kuo Min.*

TRANS-PACIFIC FARES CUT.—The American Mail Line has announced that effective immediately, it is possible to travel from Shanghai to Seattle in a first class cabin with a private bath for as low as G.$389.00. This rate applies to the President steamers, *Taft*, *Madison*, *Cleveland* and *Jefferson*, which maintain a fortnightly service from Oriental ports to Victoria and Seattle. There have been many major cuts in the American Mail Line's passenger fares recently. A ticket may now be purchased in a special class cabin for G.$185.00 Shanghai to Seattle. An innovation in the American Mail Line's special class is cabins with private bathrooms attached for G.$250.00.

ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW

上海黃浦灘念四號

遠東時報

FUNDAMENTALS
HOW WARS ARE CREATED
OUR ISLE OF SAFETY
WHILE MOSCOW LAUGHS
THE DIFFICULTY

Vol. XXVIII FEBRUARY, 1932 No. 2

per person as against the 70-80 kw.-hr. considered necessary. A new plant is under construction which will generate 300,000 kw.

Novo-Sibirsk is growing so rapidly that there is an acute shortage of housing. Construction is going on everywhere, yet the dwelling space per person (four square meters) is still less than half the norm. By 1934 it is expected that modern buildings will replace all the old wooden structures. At the combine plant a "socialist city" is being built, twenty apartment houses being up already and more under construction. The sewage and water supply systems are also far below the requirements. Few of the streets have water mains as yet and, due to the severe winters, these must be laid thirteen feet underground. A shortage of labor in every field makes it difficult to expand construction at the rate demanded.

Cultural Development

Culturally, the city is expanding as rapidly as industrially. A number of universities and technical colleges are already in existence or being built, although two years ago there were none. The first Siberian Institute of Railway Engineering, which is now under construction, will have four college buildings, each five stories high. There will be a dormitory for the students and research workers, which will be the biggest building in the city, costing six million roubles.

A new hospital is being built in the nearby pine woods, which will be connected with a medical college. Another pine tract has been selected for a Park of Culture and Rest, upon which over 50 million roubles will be expended during the next few years. In a number of other places along the Ob River wooded land has been set aside for parks, rest homes and vacation resorts.

A hotel built last year, which was the largest in the city, has been outstripped by the new Dynamo Hotel built by the athletic association of the same name—a five-story building with a roof garden. A number of new banks, department stores, and large office buildings have also been constructed.

One of the most striking of the new structures is a theater seating 3,000, which has been designed along the most modern lines. It has been built in a semi-circle with domed ceiling 200 feet in diameter which can be used as a planetarium. The stage is a revolving affair with spacious wings, and there is a rail encircling the building at the second floor upon which 500 feet of sets run, permitting a great number of changes of scene for each performance.

Novo-Sibirsk is 200 miles northwest of the Kuznetz Basin, one of the largest mining fields in the world, from which the coal is transhipped *via* Novo-Sibirsk. The city is in the center of the Ural-Kuznetz combine, which includes the great steel and coal district of Kuznetz Basin and the steel mills of the Urals. Steel mills, non-ferrous metal plants, coal mines, and power stations are under construction on all sides.

In addition, Novo-Sibirsk is surrounded by rich agricultural regions. Large quantities of grain are grown in West Siberia, livestock breeding, flax and sugar production are important. Dairy products, especially butter and eggs, are produced in large quantities, and many varieties of fowl. Meat-packing plants have been built recently. In general the region is one of the main sources of grain and food products in the Soviet Union.—*Economic Review of the Soviet Union.*

New Mitsubishi Plant in Korea

A Y.8,000,000 iron foundry is to be erected in Korea by the Mitsubishi Mining Company which owns a big mine in Kankyo province.

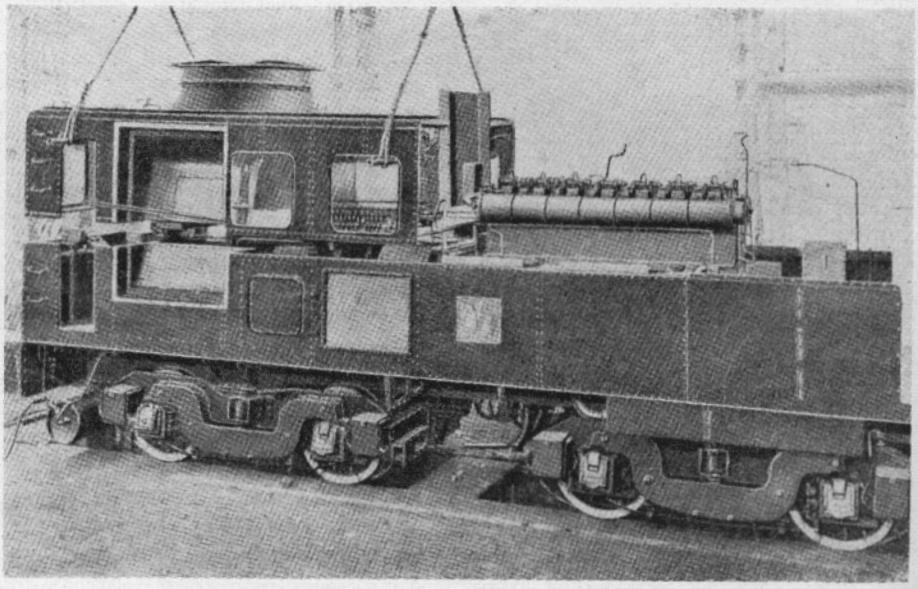
This mine, it is said, comprises a vast area of iron veins, and though no accurate figure is available it is supposed to contain between 100,000,000 and 1,000,000,000 tons of ore. The percentage of iron, however, is small and the Company hitherto has left the mine idle.

Investigations, however, have now convinced the Company of the advisability of starting mining, as the magnetic separation process will enable it to carry on the business on a commercial basis.

The proposed foundry will be erected in Seishin where the Company has already arranged for the purchase of the necessary land. The construction of the foundry will be started some time in the middle of next year.

Diesel-electric Locomotive for Manchuria

A new Diesel-electric locomotive has recently been completed in the works of Maschinenfabrik Esslingen for the South Manchurian Railway, Dairen. The locomotive of the 0—4—0+0—4—0 type has two bogies with two driving axles each. They are driven by four 100-kw. axle-suspended motors. The enclosed upper portion of the locomotive, containing two engine rooms and two driving cabs, rests doubly spring-borne on the bogies at four points. The prime mover, constructed by Maschinenfabrik Augsburg-Nürnberg, is a seven-cylinder four-stroke Diesel engine with airless fuel injection, developing 700-h.p. at 700 r.p.m.; its unit weight is 9 kg. (20 lb.) per h.p. The cooling-water is circulated by a centrifugal pump with electric drive, which is controlled from either of the driving cabs. The reversing controller, the starting and stopping gear for the engine as well as that for setting it to the three working speeds of 300, 500, or 700 r.p.m., are electro-pneumatically operated from the driving cabs.



The New Diesel-electric Locomotive being assembled

The electrical equipment has been supplied by Messrs. Brown Boveri & Cie. The generator of 435-kw. and the 68-kw. exciter have a common shaft, which is rigidly coupled to that of the Diesel engine. The exciter also supplies the current for all the auxiliary drives. A storage battery is provided for starting the Diesel engine, and to enable all the auxiliary drives to be run when the Diesel engine is at rest.

The radiators for cooling the water and oil are mounted in the sides of the locomotive; the necessary cooling-air is drawn through the radiators by a fan and exhausted above the roof, the blast being used to draw the exhaust gases from the Diesel engine. In the stationary tests carried out on the test-bed at the Esslingen works, a thermal efficiency of as much as 27 per cent was obtained. The locomotive has an overall length of 11.2 m. (36-ft. 9-in.), an overall width of 3.21 m. (10-ft. 6-in.), an overall height of 4.66 m. (15-ft. 3-in.) and a weight in working order of 73.6 tons. The maximum speed is 60 km. (37.3 miles) per hour; the maximum tractive effort amounts to 17 tons, and the tractive effort, at hour-rating of the motors, to seven tons at 17 km. (10.6 miles) per hour.

within the locomotive depôt at any one time in the 24 hours. The shed, when completed, will be equipped with electrically operated apparatus for lowering locomotive wheels requiring attention. It will contain plant for hot water washing out of boilers and for holding locomotives in steam, ready for service, by means of a live steam main running round the shed and, in addition, will have the usual workshop, machinery, and store accommodation.

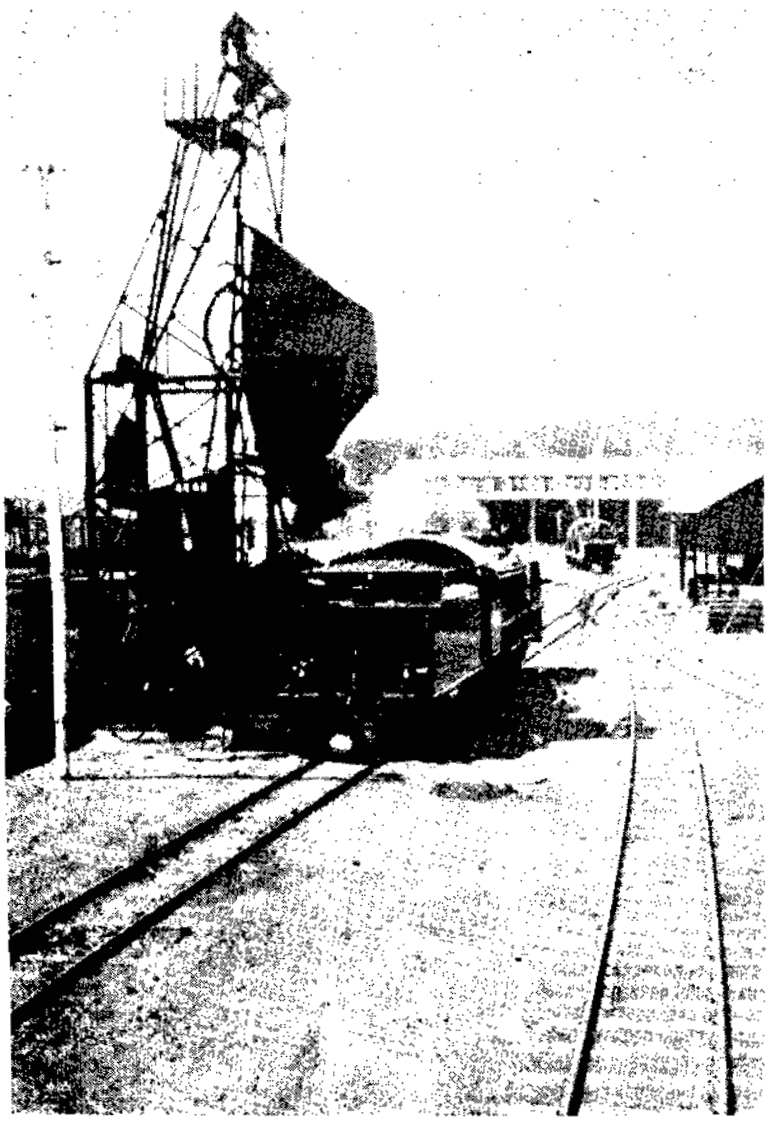
The locomotive yard contains a Mitchell coal handling plant. Coal is supplied to an underground hopper from 40 ton hopper wagons. From the underground hopper it is raised to an overhead hopper from which a locomotive can be supplied with five tons of coal in rather less than one minute.

On two of the roads leading into the locomotive shed Mitchell ash handling plant is provided. A locomotive placed over this plant drops the ash accumulated in the ash pan, fire-box and smoke box into an underground hopper from which the ash, after quenching, is lifted by mechanical means into wagons standing between the two lines.

The use of coal and ash handling plant effects considerable saving in labor costs.

The turn-table in the center of the new Round House is equipped with an electrically operated tractor. A locomotive can be placed on the turn-table and turned round in rather less than one minute.

It is expected this new locomotive depôt will be brought into use in the latter part of this year when the Railways expect to benefit by the better facilities for servicing and maintaining their locomotive stock in this district. The value of the locomotives passing through the shed in 24 hours will be about $2,000,000, which figure suggests how important it is that each locomotive should be passed through the shed and re-conditioned ready for further service in as short a space of time as possible, so that the greatest amount of work per locomotive may be obtained.



The Coal Handling Plant

The Ash Handling Plant

British Locomotives for China

There have recently been put into service on the Peping Liaoning Railway, six Mikado (2-8-2)-type standard-gauge locomotives, built by the North British Locomotive Co., Limited, of Glasgow, to the order of the Kailan Mining Administration of China. These locomotives have cylinders of 21-in. dia. and 28-in. stroke. The leading bogie, coupled and trailing bogie wheels are 3-ft. 1½-in., 4-ft. 6-in. and 3-ft. 7-in. dia. respectively, while the rigid wheelbase is 15-ft. and the total wheelbase 31-ft. 4-in. The total heating surface (2,726 sq. ft.) is made up of :—tubes (small) 1,256 sq. ft., tubes (large) 705 sq. ft., firebox 140 sq. ft., firebox (syphons) 42 sq. ft., and superheater 583 sq. ft. The firegrate has an area of 41.4 sq. ft., and the boiler working pressure is 180 lbs. In working order, the engine has a weight of 84 tons 5 cwt., of which 62 tons 1 cwt. are carried on the coupled wheels. The tender— carried upon two four-wheeled (2-ft. 9-in. dia.) bogies—has 450 cu. ft. (10 tons) of fuel space, a tank capacity of 5,000 gall., and weighs (full) 59 tons 19 cwt. The tender has a wheelbase of 18-ft. 7-in., and the engine and tender a wheelbase of 59-ft. 1½-in. The Westinghouse brake is fitted to both engine and tender, and the special equipment of these locomotives includes mechanical stoking apparatus.

Engineering Notes

INDUSTRIAL

POWER PLANT AT ICHANG.—The Chinese Ministry of Industry announces that a fifty million dollar water power project near Ichang is to be constructed within three years. Mr. Chen Kung-po, the Minister has already authorized the construction of a 40,000 kilowatt hydro-electric power plant at Ichang as part of the five-year industrial plan for the development of the Yangtze valley. According to experts the flow of water in the Ichang gorge was recorded as 800,000 cubic feet a second last October and he estimates that horse power to the total of 22,000,000 can be developed there. The 40,000 kilowatt station at Ichang will first be constructed, utilizing 56,000 horse power of what is available there.

CAN MAKING PLANT.—With the object of developing the tin can-making trade in South China, the newly established China Can Company Limited, officially has opened their new factory at No. 2, Davis Street, Kennedy Town. The factory is a large establishment wherein special attention has been paid to the welfare of those employed. In time it is anticipated that a school and hospital for the benefit of the workers will be founded. Throughout, the machinery is of modern type and is capable of a very large output. The factory will turn out containers of all sorts, also signboards, crown corks, toys, tin novelties, etc.

NEW CHINESE GUNBOATS.—The Chinese Ministry of the Navy announces that two new gunboats, *Kiangning* and *Haining*, are due to be completed at the Kiangnan Dock next June, while work on a third began a few weeks ago. The three gunboats are identical in construction and armaments, being each 128 feet long, 28 feet wide, with a tonnage of 300 tons and a draft of six feet. They will have a speed of 11 knots. Besides being armed with two 3-inch guns and four machine-guns, they will also be equipped with short-wave and long-wave wireless apparatus. The cost is Tls. 150,000 for each boat.—*Kuo Min.*

RAILWAYS

BUYS EQUIPMENT.—Dr. C. Wang, director of the Chinese Purchasing Commission, whose business it is to lay out £3,000,000 of the British Boxer Indemnity on the purchase of railway and engineering material in this country, has just returned to London from his mission in Italy. In conversation with *Reuter's* diplomatic correspondent, Dr. Wang said that the work of the London Commission was progressing splendidly. A considerable amount of railway and electrical material had been purchased, the exact quantity being difficult to appraise, as there were so many outstanding orders. A steady stream of orders was being received from China, and these were being smoothly executed with all possible speed, and all the material required was being obtained from British engineering and manufacturing firms.

TO COMPLETE SECTION.—Early completion of the Tihua-Hsinghsingsia section of the Kansu-Sinkiang National Highway is ordered by the Ministry of Railways, in a telegram to the Sinkiang Provincial authorities. The Tihua-Hsinghsinghsia section covers a distance of about 315 miles, part of which, running from Tihua to Hami, has already been completed. Only 115 miles of highway in Sinkiang extending from Hami to Hsinghsinghsia (Gorilla Pass), on the Sinkiang-Kansu border, need be constructed to finish the section.—*Kuo Min.*

LONG RAILS IN JAPAN.—The Yawata works are negotiating with the Imperial Government railways for rolling 37-kg (74-lb.) rails 24 m. (about 80-ft.) long as an experiment to be tried on the railways in Japan.

AVIATION

HANEDA AIRPORT.—The Japanese Aviation Bureau will celebrate with an elaborate ceremony the completion of the Tokyo International Airport here early in April. Although the Airport was opened for international flyers' take-offs and landings last August, most of the equipment had yet to be built. The *Tokyo Nichi Nichi* plane sheds which had been under construction in one corner of the flying field were recently completed, while the Japan Air Transport Company's hangar and business offices are steadily nearing completion, the workers having removed the scaffolding recently. The completion late in March of the sheds for the Japan Aviation School's land and sea craft will mark the end of the construction work on the Airport premises.

CHINESE AIRPLANE PLANT.—A new plant is being built by the Chinese Ministry of Navy for the construction of airplanes near the existing plant in Shanghai, according to the head of the bureau of airplane construction in the Ministry of Navy. It is of 121 feet deep and 50 feet wide. The main floor will be devoted to assembling and manufacturing. It is scheduled to be completed by the end of June. Plans for six airplanes of 220 horse-power each are being laid out. They are to be completed by the end of this year. Besides these six planes, two fighting crafts are being considered. Work on these two will start early next year.

BERLIN-SHANGHAI AIR LINE.—Some time in 1932 the long-projected Berlin-Shanghai air line will become an accomplished fact, according to aviation circles in Berlin. The line will operate in three sections, Berlin-Moscow, Moscow to the Sino-Soviet frontier and from the border to Shanghai.—*Havas.*

SULZER BROTHERS

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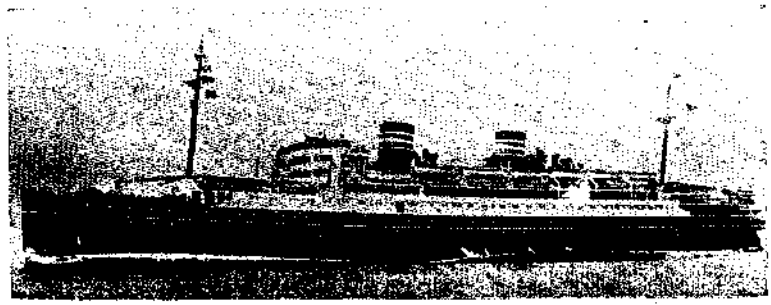

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ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW

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遠東時報

BEFORE IT IS TOO LATE!
THE HIGHWAY TO HOSTILITIES
JAPAN WALKS INTO A TRAP
THE PACIFIST ROAD TO WAR
AMERICA CANNOT FIGHT JAPAN

Vol. XXVIII | MARCH, 1932 | No. 3

and occupancy survey will be included. It is felt that this may be an important contribution to a better planned direction of building activity.

One report deals with the subject of construction employment statistics, commenting in particular on those gathered by the United States Department of Labor. Another report is considering the census of the construction industry taken in 1930.

The Committee on the Elimination of Wastes and Undesirable Practices has set up four sub-committees to report on certain phases of the following four groups of problems: (1) management and labor, (2) standardization, (3) planning, (4) intergroup relations.

Such subjects as seasonal operations, inspection practices, and advance planning of construction are being given special consideration.

The Committee on Realty Finance decided to report on four matters, including a study of statistical information of interest to financial groups in connection with their construction activities and a consideration of appraisal technique and organization. Certain proposed legislation relating to guaranteed mortgages and uniform mortgage acts will be considered, and some attention will also be given to junior mortgage facilities.

The Committee on Local Organizations has prepared a report embodying a study of local types of organization desirable to represent the construction interests comprehensively in any community and has prepared certain recommendations relating to possible activities of the National Conference on Construction in connection with sponsoring and assisting such local organizations.

The Committee on Economic Relationships has prepared a tentative report dealing with the relationships existing in the building field, particularly those between general contractors, sub-contractors, architects, and owners. The subject of bid peddling is being considered, and attention is being given to the matter of pre-qualification of general and sub-contractors.

These reports will first be submitted to the Executive Committee. By preparing well in advance carefully worked out recommendations based on a consideration of the viewpoints of the several groups in the industry, it is hoped that a group can be built up which will be able to consider intergroup problems even of a controversial nature and agree on recommendations for their solution. The intensity of the discussions in these committees has revealed a great interest in the possibilities if intergroup action, as well as the great difficulty of arriving at conclusions which give full consideration to the numerous and sometimes conflicting viewpoints of the several trade groups.

A general meeting composed of official delegates, presidents and secretaries of the various trade and professional associations, including the mortgage banking, materials supply and real estate associations, will be called when a sufficient number of recommendations have been brought forward by the fact-finding committees. This group would presumably meet at intervals thereafter. It is hoped that through these efforts some consciousness of a fundamental community of interest in the construction industries will be developed, and the possibilities of intergroup action as a means of improving existing practices may be impressed upon the various co-operating groups.

The Railways of China

British Interests in State-owned Undertakings

EIGHT years ago it was possible to say of the railways of China that they had been showing, since the establishment of the republic in 1912, steady and almost continuous progress. The remarkable statement was then made, on reliable authority, that the annual volume of accounts and statistics of the railways of the Chinese Republic was unsurpassed in the excellence of its general form by that of any railway system in the world. The information it contained, moreover, told of growing traffic and receipts, and an ample revenue that more than covered an adequate return on capital invested. But all this was changed by the prolonged civil wars. After the death of Yuan Shih-kai, the first President of the Republic, there was no one man strong enough to hold together the forces of the nation, and the various war-lords or provincial generals, who held rule successively over separate districts, fought each other so persistently that internal developments of all kinds were quickly brought to a standstill, and transport conditions fell into a state of chaos.

Actually, the first thing that happened when warfare broke out was the seizure of the main railway lines by the nearest and strongest forces. Hence, disruption and destruction were rampant and almost complete, nor did the partial cessation of internal hostilities which preceded the present troubles with Japan enable any great progress to be made in the rehabilitation of these unfortunate undertakings.

Fifteen Administrations

The Chinese Government Railways are divided into fifteen separate administrations, these comprising:—the Peiping-Hankow Railway, Peiping-Mukden Railway, Tientsin-Pukow Railway, Shanghai-Nanking and Shanghai-Hangchow-Ningpo Railway, Kiao-Tsi Railway, Peiping-Suiyuan Railway, Lunghai Railway, Canton-Hankow Railway, Human-Hupeh Railway, Chengtai Railway, Canton-Kowloon Railway, Nanchang-Kiukiang Railway and Taokow-Chinghua Railway.

Originally, some 1,598 miles of these railways were virtually under British management, the right of appointment of the principal officers of certain lines being vested in the representatives of the British capital involved, in accordance with the terms of the various loan agreements. In recent years, however, the bulk of these appointments have lapsed into Chinese hands, though certain important posts are still retained by nominees of the British interests concerned. At the present time, British financial interests in the Chinese Government Railways are represented by the British and Chinese Corporation, Limited, of 3 Lombard Street, E.C.3 (Shanghai-Nanking, Shanghai-Hangchow-Ningpo, Canton-Kowloon and Peiping-Mukden Railways), and the Pekin Syndicate, Limited, managers and administrators of the Taokow-Chinghua Railway. In Manchuria, there is the Chinese Eastern Railway (the Russian administrative personnel of which was ousted by the Chinese), the Kirin-Changchun Railway, the headquarters of which are at Changchun, and the South Manchuria Railway, the Japanese-owned system which was the cause of much of the friction leading to the present troubles between China and Japan. Actually, China possesses some 8,750 miles of railways, a mileage which is vastly lacking in proportion to the area and population of the country.

Shanghai-Nanking Railway

The Shanghai-Nanking Railway, which has a mileage of approximately 260, of 4-ft. 8½-in. gauge, suffered very badly during the civil wars, and has now sustained further damage owing to bombardment by Japanese warships (the North Station, an exceptionally fine building, was demolished). The preliminary arrangements for the construction of this system were made between the Chinese Government and the British and Chinese Corporation, Limited, in 1898, but, owing to various difficulties, work was not commenced until 1904. In addition to Shanghai and Nanking, the principal stations are Suchow, Wusih, Changchow and Woosung.

Peiping-Mukden Railway

The Peiping-Mukden Railway (formerly known as the Pekin-Mukden Railway) has some 683 miles of line open and about 156 miles under construction. It is of 4-ft. 8½-in. gauge, and was completed in 1896, being built with Chinese capital which was later supplemented by a British loan. The system consists of a main line from Peiping (Pekin) to Mukden, where the South Manchuria Railway is joined, and branch lines to Chungchow, Hsiku, Chinwangtao and Yingkow.

The Peiping-Hankow Railway, with a mileage of 700, was completed in 1905 by a Belgian syndicate largely financed with French capital, the line being taken over by the Chinese Government in 1907. The principal points served are Paoting, Chonentafu, Chenting, Chengchow, Sutchon, Suiyang, Yentching and Choumatien. The Peiping-Suiyuan Railway is 550 miles in length, and was constructed out of funds provided by the profits made by the Government railway between Peiping and Hsinminting. Originally, the line ran from Peiping to Hankow Pass, but in 1909 it was extended to Kalgan and, later, to Paoton.

Tientsin-Pukow Railway

The Tientsin-Pukow Railway, which is some 690 miles in length, connects Peiping with Pukow, on the Yangtze River, opposite Nanking. It is one of the most important trunk lines in China, and capital for its construction was raised by means of British and German loans, the section between the Grand Canal and Pukow (236½ miles) being built by British capital and British engineers. Owing to various delays, it was not until 1912 that through running on the line was possible. Connection with the Shanghai-Nanking Railway is made by means of a ferry service across the River Yangtze, between Nanking and Pukow, whilst the line joins the Peiping-Mukden Railway at Tientsin.

Canton-Kowloon Railway

It was in 1898 that the British and Chinese Corporation, Limited, obtained the concession to build a railway between Canton and Kowloon, a distance of 89¼ miles, and the line was opened for traffic in October, 1911. The line was financed by a British loan, repayment and interest being guaranteed by the Chinese Government. The whole of the line is single track, but there are 12½ miles of sidings and loops.

The Taokow-Chinghua Railway, which is about 95 miles in length, was built by S. Pearson and Son, Limited, for the Pekin Syndicate, Limited, the line between Taokow and Pashan (90½ miles) being opened for traffic in 1905. The same year the railway was taken over by the Chinese Government and extended to Chinghua.

Manchurian Lines

The South Manchuria Railway, which was acquired by the Japanese Government under the terms of the Peace Treaty between Japan and Russia in 1905, comprises some 691 miles, of which 438½ miles represent the main line from Dairen to Changchun. The Mukden-Antung line is 162 miles long, the Port Arthur line 32 miles long, and the Fushun line 33 miles long. The doubling of the line between Dairen and Changchun was completed in 1915. The whole of the area covered by the company's operations is divided into two divisions, with offices respectively at Mukden and Dairen; and the many and varied operations are classified under five departments, each having a chief who acts as general manager of the department, and comes directly under the board of directors. The five departments are those pertaining to (1) railways, (2) local affairs, (3) industries (including the upkeep of museums, agricultural, geological, etc.), (4) treasury, and (5) general affairs.

Political Aspect

As to the political aspect of the South Manchuria Railway in Japanese hands, it may be said that, previous to this epoch, Manchuria was in large measure a closed area, a forbidden land; such produce as went outside its own frontiers, or beyond the district in which it was produced, was taken by primitive Manchurian cart or the natural waterways; and there was practically no immigration. Since the fertility of the country has been increased and its productivity, especially along the railway zone, has become known, a continuous stream of immigration from other parts of China has been set up, and the population of Manchuria is rapidly increasing. Along the railway zone, in 1907, the Chinese population numbered only 8,902, whilst latterly it was over 900,000 out of a total population of over 1,100,000—82 per cent of the whole—and an ever-increasing stream of immigrants was, until recently, continuing to move northwards along the railway lines from the disturbed and famine-stricken regions of China. Actually, the produce of this area is transported mainly, although from Chinese soil, by Russian or Japanese Railway to the port, and China is, or has been, constructing competing railways and a new port (Hulutao), so as to secure some of this transportation for her own nationals. Hence the recent troubles in Manchuria.

Chinese Eastern Railway

The Chinese Eastern Railway, one of the earliest to be built in China, is of 5-ft. gauge, its headquarters being at Harbin, Manchuria. The agreement for its construction and operation was signed by the Chinese Government and Russo-Chinese Bank in 1896, and, whilst the preliminary work was in hand, Russia seized Port Arthur and obtained a lease of the Liaotung Peninsula with the right to build a railway to join the previously authorized line at Harbin. The main line connects the Trans-Siberian Railway with Vladivostock, the distance covered being 950 miles, whilst the southern section from Harbin to Port Arthur has a mileage of 650. Some 437 miles of the southern section were handed over to Japan at the conclusion of the Russo-Japanese war in 1905, hence only the portion between Harbin and Changchun now forms part of the Chinese Eastern Railway.

Hope of Rehabilitation

The terrible chaos wrought by the civil wars, coupled with the new threats of warlike action between China and Japan, give little immediate hope for the rehabilitation of the railways of China. Nevertheless, those who know China best are hopeful that a return to peaceful conditions will witness the rise of the railways once again. In the future, however, two great railway needs must be met. First, there is the completion of the Canton-Hankow line. Some of this railway is constructed already—a section at each end, from Canton northwards, and from Hankow southwards towards Canton—but there is a big gap of some 300 miles between these two sections. The completion of this missing link will have an enormous effect in the relationship between North and South China, through the development of new traffic; but, like all progressive and essential developments, it has met with much opposition, though no one doubts the immense stimulus that it will give to travel and traffic. Secondly, the great and wealthy province of Szechuen, with a population of 65,000,000 has not a mile of railway to-day; its port, Chungking, is some two or three weeks from Nanking or Peiping, and this province in the west must be more directly connected with down-river towns and with the world at large.

London Purchasing Commission

A development of particular interest as affecting British relationship with the Chinese railways was the setting-up of the London Purchasing Commission, in April of last year. This body whose business it is to arrange for the expenditure of £4,000,000 which has been allotted from the Boxer Indemnity Fund for the use of Chinese railways, is under the chairmanship of the Chinese Minister in London, and consists of two Chinese and four British members:—Dr. Sao Sze, Chinese Minister in London; Sir Arthur Balfour, vice-president of the International Chamber of Commerce; Sir Basil Blackett, chairman of Imperial and International Communications, Limited; Mr. W. T. Charter; Dr. C. C. Wang, formerly managing-director of the Chinese Eastern Railway; and Sir Ralph Wedgwood, chief general manager of the London and North Eastern Railway. A similar body in China, known as the Board of Trustees, which has to deal with the disposition of Boxer Funds in China, consists of Mr. Calder Marshall, chairman of the British Chamber of Commerce, Shanghai; Mr. Kenneth Cantlie; Mr. N. S. Brown, manager of Butterfield and Swire, Shanghai; Sir W. W. Hornell, vice-chancellor of Hongkong University; Mr. W. H. Donald, adviser to General Chang Hsueh-liang. The Chinese members of this board, of whom there are ten included, when it was originally set up, Chu Chia-hua, chancellor of the Central University of Nanking, who was to act as chairman of the board; and L. T. Soong, brother to T. V. Soong, the Minister of Finance. The board, which is under the Executive Council of the National Government, was appointed for a term of three years. Its head office is at Nanking. Many orders for British railway material have already been placed by this means.

Engineering Notes

INDUSTRIAL

SHOWA STEEL PLANT.—Shingishu has been chosen as the site for the Showa Steel Works to be established by the Japanese Government, according to Overseas Minister Hata. With the Government's decision to establish the Showa Steel Works in Shingishu, Governor Uchida of the South Manchuria Railway, who has been advocating the choice of Dairen, may tender his resignation, it is surmised.

FUNDS FOR CHINESE MILLS.—Having received the official approval of the Central Political Council concerning its proposals for the employment of surplus funds of the British Boxer Indemnity Refund as security for the purchase of spindles and other textile machinery on long-term credit basis, the Nanking Ministry of Industry is now consulting various Chinese cotton mills in Shanghai regarding such purchases and other related matters. It is learnt that the Ministry of Industry is considering another industrial project aiming at the development of China's famous porcelain industry. Plans are being drafted for the establishment of a porcelain factory at Kiukiang or some convenient center to be financed by appropriations from surplus funds of the British Boxer Indemnity Refund. Machinery of the now defunct China Porcelain Works at Kingtehchen will be utilized by the proposed company. Establishment as soon as possible of a large-scale Government factory for the manufacture of woollen piece goods to meet domestic demands is urged by the Greater Shanghai Chamber of Commerce. The petition points out that woollens have become one of the necessaries of the people, the value of the annual imports having amounted to the figure of over Tls. 50,000,000.

JAPANESE TO PAY.—Foreign business firms in Manchuria, which have been fearing they would lose all money owed to them by the Chinese, have been informed by the Japanese that they will assume full responsibility for most of these debts.

Among items affected by this understanding are 19 light aeroplanes delivered by a British firm to Marshal Chang Hsueh-liang, then Governor of Manchuria, last September, of which 12 were paid for. The Japanese confiscated all these machines.

Some firms have already received payment for goods delivered to the Manchurian authorities before the Japanese started to take charge at the end of September though payment was held up for some time.

Settlement of bills is thought to have been much more prompt under the Japanese régime than if the old Manchurian Government had remained in power, for Marshal Chang's credit is said to have been falling to a low ebb.

MINING

COAL MINING IN CHINA.—In view of the importance to the Lung-Hai Railway of the coal mines in Hancheng, Eastern Shensi, a technical expert of the Chinese Ministry of Industries has been sent there to conduct an investigation on the feasibility of working the mines at an early date. A large coal field has recently been discovered at Lang-Tung-Ko, in Kirin Province. A company has been formed to work the field, the necessary permit having been granted by the Provincial Government authorities. It is estimated that, when fully worked, the new field will produce enough coal to meet the demands of the Kirin and Heilungkiang Provinces for the next 20 years.

ELECTRICAL

ELECTRIFICATION IN JAPAN.—Provided that official permission is obtained the Tokyo Suburban Railway will start work this month on the construction of the first section of its line between the Shibuya and Kichijoji stations on the Government Electric Railway. The Mikko Mountaineering Electric Railway has decided to proceed with the construction of the second section of its line at a cost of Y.500,000. The Watashi-gawa Hydro-Electric Company has decided to erect a 11,230 kw. hydro-electric station on the Niita River in the Kochi Prefecture.

MERGER IN MANCHURIA.—A fusion scheme of power and light companies in Manchuria, some 60 in all, is projected in Manchuria, with a view to further develop the agricultural industry, indicates the telegram received at the Industry Department of Osaka Municipal Office.

The program regarding this plan is as follows:—

1. To electrify the agricultural industry in the entire country within the next five years.
2. To enlarge the power plant in Fushun in an attempt to control the power supplying business in the region of South Manchuria.
3. To build a big transmission plant in Harbin.

The plan calls for some Y.100,000,000 as capital.

HARBIN POWER PLANT.—According to Japanese information, the Harbin power plant and tramway system will be purchased from the new Kirin government by the South Manchuria Electric Co., a Japanese concern.

RAILWAYS

CENTRAL CHINA RAILWAY.—The Hangchow-Lanchi railway, approximately 160 miles, is expected to be completed before the end of March. From Chuki to Lanchi there will be ten stations. It is estimated that the entire line will cost the Chekiang Provincial Government $4,000,000.

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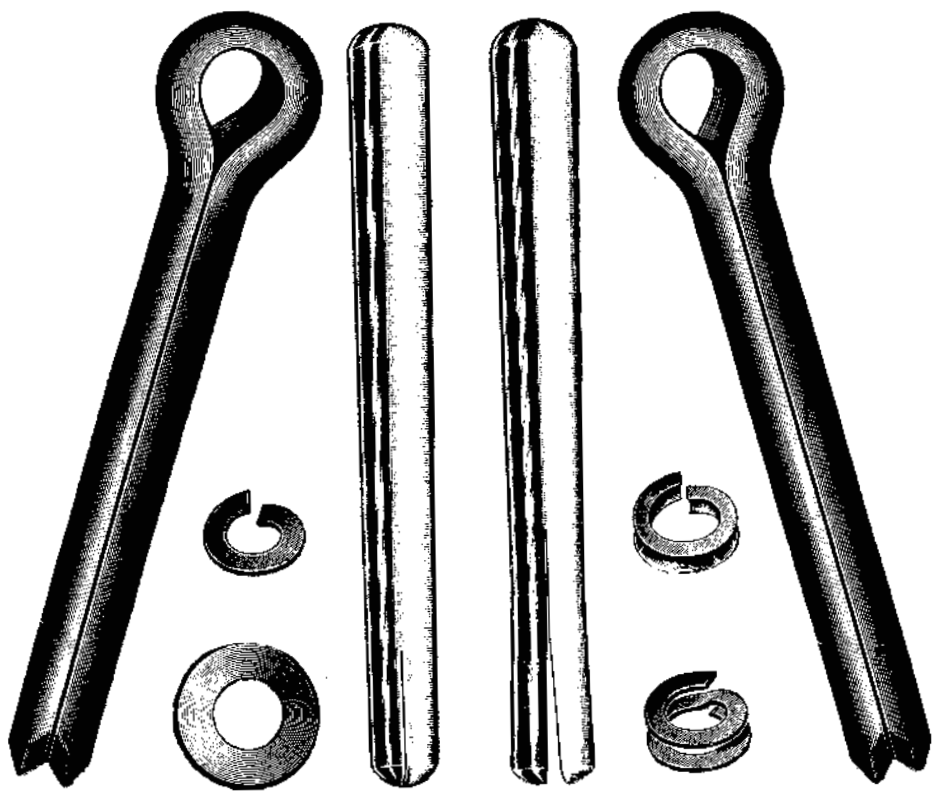

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DEBUNKING THE OPEN DOOR POLICY

THE DOOR TO MANCHURIA

THE TRAGIC ENDING TO A DALY OPERA

Vol. XXVIII APRIL, 1932 No. 4

Hangchow-Kiangshan Railway

The Hangchow-Kiangshan Railway, one of the few railway projects in China to start actual construction in recent years, is drawing to a close of the first stage of its progress. This is the completion of its line to Lanchi, a distance of 201 kilometers (125 miles) from its starting point at Hangchow. Train service is now in operation to I-Wu (76 miles) and track laying is progressing at an average rate of one kilometer per day. This rate will be increased shortly and it is expected that service will be extended to Lanchi soon.

Grading for the entire line has been completed and, with the exception of a small amount of culvert work, all other details are ready for track laying. Conditions peculiar to the section through which the farther portion of the line is constructed, together with the present financial situation, have influenced both the design of the structures and the methods employed in erecting them.

During the past year, the rate of exchange, from silver to gold dollars, has remained at an average of about 4½ : 1. This has made it imperative that local materials be used to the fullest extent possible. More often than otherwise, this has resulted in more permanent construction than was originally planned, mass concrete arches being employed instead of temporary timber trestles, and concrete pipe culverts instead of corrugated metal.

Four feet diameter concrete pipes were as large as could be conveniently handled with the equipment available. When a larger section was required, these were placed in multiple strings, up to four lines.

On account of the high cost of lumber for culvert forms, these were of standardized design so far as practicable, in order that the same forms might serve for a number of culverts. No reinforcing material was used, excepting in the larger sizes of pipe culverts, 36-in. and larger.

A few short-span deck girders were used, the masonry supports being prepared in advance of track laying and the girders brought up and placed by the track gangs. A few 20-ft. openings, designed for deck plate girders, have been crossed by the use of timber stringers, with knee braces. Where longer spans were required and it was not feasible to place the steel girders during the period of construction, intermediate concrete footings were placed in the stream bed and temporary intermediate timber bents were erected to carry wooden stringers. This proved more economical that the construction of pile trestles, both because of the difficulty of transporting pile driving equipment, and because rock frequently was reached at shallow depth.

Owing to a long-continued low river stage, and other causes, the delivery of cement for the completion of a few of the 12-ft. and 16-ft. arch culverts was delayed. In order that the arch rings might have the full time required for setting, without delaying track laying, an ingenious expedient was adopted by the engineer in charge of construction. Empty cement drums (which are of metal) were used as forms for the construction of concrete columns which rested on the culvert walls and were later partially imbedded in the concrete of the arch rings. Timber caps and stringers were placed on these columns, to carry the track until the arches were ready to receive the load of filling and track. This method, saves two or more weeks delay in track laying. All material, with the exception of the portion of concrete in the columns which extends above the arch ring, is available for other purposes.

Transportation of materials which were required in advance of track laying often was a major problem. Cement of local manufacture was purchased in Shanghai, brought by rail or water to Hangchow, and transferred to junks for hauling up the Chien Tang River, or by canal to nearby points. In the most extreme cases, the cement was taken by junks to Lanchi (over 100 miles), usually making a part of the trip under sail but always requiring man-power for a considerable portion of the trip. At the shoals and rapids, the men stood in the river, shoving and lifting the craft through the current, instead of pulling by two lines from the shore.

At Lanchi, the cargo was transferred to smaller junks for transporting up the Kin Wha River as far as the stage of water would permit. At this point, the last word in shallow-draft craft was available, a bamboo raft resembling a huge toboggan. These can very nearly comply with Mark Twain's specification for a steamboat for navigating the upper Missouri river, one that can "run on a good, heavy dew."

From the bamboo rafts, the cement was transferred to wheelbarrows for an overland trip, on roads which were designed only for pedestrian travel. Cement purchased in Shanghai for M$7.10 might easily cost nearly M$11.00 on the job. Considering the difficulties of transportation, even this cost does not appear excessive.

The construction of a railway in China presents some difficulties not common in other countries. We have all read of the troubles encountered by the early lines, in getting through or past the many graves scattered over the country. A *modus operandi* has now been developed which greatly simplifies this though it still is something of a problem. The walled cities also present a special difficulty. In the interior, there is not only a local sentiment against making a breach in such a wall but it may yet serve a useful purpose in defending against bandit raids. Also, the walled-in areas usually (though not always) are completely filled with solid blocks of buildings, separated by narrow, paved streets. A right of way through such an area would be most difficult to obtain.

In most cases, the railway is located as close to the city wall as practicable though in the first two cases reached by this line, a small breach was made at the corner of each of the walls, under an agreement with the local authorities. There is a mystery surrounding the disappearance of some of the immense stone blocks with which these walls were faced though in some of the railway bridge abutments and culvert head-walls may be found some exceptionally massive masonry which does not bear any evidence of having come recently from the quarry. The city wall of Chuki, which dates back at least to the time that Columbus was promoting his great development scheme, rests on the talus of a prehistoric mountain slide. In cutting through this material, to a depth of eighteen feet, a vitrified drain tile, obviously in their original position, were exposed by the grading gang.

Future Plans

Location surveys and detailed estimates have been completed for the second section, which is to extend to Yushan, a total distance from Hangchow of 230 miles. This will reach the head-waters of the river system of Kiangsi Province. Construction on this section will be started as soon as the line is completed to Lanchi. Nearly the entire northern half of Kiangsi Province can be reached by boats which navigate up to Yushan.

Character of Line

The line is designed strictly as a "Light Railway," excepting that all permanent waterway structures are capable of carrying heavy traffic and, so far as practicable, other features are designed for a later revision, without waste, to conform to Chinese Government Railway standards. The favorable nature of the country traversed has made it possible, with little effect on the cost, to adhere to a limit of six degree (metric) curves and one per cent grades, the latter compensated for curvature.

From purely financial reasons, 35 lb. rail was used. All temporary track structures were designed to the limit imposed by this light section of rail, the axle loads assumed for designing being seven tons for cars and 8.6 tons for locomotives.

The same standards of construction will be adhered to in the extension to Yushan. About 70% of this extension will be a valley line, the remaining portion, from Kiangshan to Yushan, passing over the mountain range which forms the boundary between Chekiang and Kiangsi Provinces. An unusually favorable, low saddle affords an easy passage through this range, with light work and little curvature.

Method of Financing

Owing to the unfortunate conditions in China for the past several years, few new projects have been attempted, and a still more limited number have reached the point of actual construction.

(Continued on page 181)

Course control of the speed is effected by the centrifugal switch mounted on the motor shaft. If the synchronous speed exceeds 10% to 15%, the contacts of the centrifugal switch open and the main switch is disconnected; the brake magnet which thus become de-energized falls, the safety brake acts and shuts down the plant. In the case of important plants, it is, moreover, endeavored to control the speed during the entire trip, including the accelerating and retarding periods. With a D.C. winding motor in Ward-Leonard connection this can be accomplished simply and safely, for with this arrangement every position of the control level corresponds to a certain speed. In order to adhere accurately to the prescribed winding diagram, the depth indicator is furnished with a cam wheel which is driven by the latter and shows the pertaining speeds at the various depths. The movement of the cam wheel is transmitted to the driver's platform so that the stroke of the control lever is limited. Hence the lever cannot be intentionally adjusted to a higher speed than is prescribed for the corresponding position of the haulage track.

With the three-phase motor on the contrary, the speed is not clearly defined by the position of the lever—which in this case actuates the liquid startor—for it may differ with one and the same rotor resistance, depending upon the load. Cam wheels are fitted on the depth indicator in this case also, but only limit the speed at full-load. Reverse current braking must be adopted when lowering loads, whereby the speed is particularly liable to attain an excessive value. With three-phase drives therefore, an auxiliary safety apparatus is employed to ensure accurate speed control. This apparatus is connected with the main shaft of the winder and at each point of the haulage track compares the actual speed with that prescribed, through the agency of a centrifugal governor. Should the prescribed speed be exceeded at any point of the track, or when starting and shutting down, the apparatus trips the oil breaker of the motor and the safety brake engages.

With winders which are also determined for men winding and work at higher speeds than 13-ft./sec., the safety apparatus is extended to form a trip governor. This apparatus does not shut down the winder when the speed is exceeded, but re-establishes the prescribed speed automatically by actuating the manœuvring brake. The maximum degree of safety is attained with this apparatus. A safety apparatus was entirely adequate for the winding plant at Fushun as only material is wound.

The underground loading bridges and the overground hopper plant as well as rope sheaves were designed and supplied by the Bamag-Meguin A.-G., Berlin-Cologne-Bayenthal. The mechanical equipment of the winders was supplied by the Linke-Hoffmann-Buschwerke, Breslau. The entire electrical equipment for the pit-head and underground was supplied by the AEG.

Hangchow-Kiangshan Railway

(Continued from page 177)

While Chekiang Province has suffered less from political disturbances, floods, and other troubles than almost any other section, it has suffered indirectly with the rest of the country. It has been only through the foresight, energy and resourcefulness of former Governor Chang Chin-kiang that the line has been made possible. As much of the Provincial revenues as could be spared were devoted to the construction of this railway and the credit of the Province was pledged to local banks for the small loan found necessary for its completion. Governor Chang, who is now Chairman of the National Construction Commission, is one of the "elder statesmen" of China, was a member of the original revolutionary group which supported Dr. Sun Yat-sen, and is still active in National affairs.

The project is administered as a strictly Provincial venture, through the Construction Division of the Province. The present Commissioner of Construction, Mr. Y. F. Tseng, served for three years as Vice-Chairman of the National Construction Commission and has undertaken to complete this railway through to Yushan as one of the major projects of his Department for the coming year.

Operation

The first section of the line to be completed, 32 kilom. in length, was placed in operation on June 1, 1931, the service being extended gradually as the track was completed.

This progressive extension of service has given an excellent opportunity for observing the effect of additional length on the revenue derived per unit of length.

This shows an average daily revenue of M$1.39 per kilometer during the 27 days that service extended only to Chien Shan (32 kilom)., with a step by step increase to a daily average of M$10.19 with service to I-Wu (128 kilom.)

As was fully expected, the initial revenue has consisted almost entirely of that derived from ticket sales, the development of freight business in this country necessarily running parallel with a gradual evolution of the economic changes which take place in the territory served. The only exception to this is the case of a railway which passes through an area already served by canal or river transportation. Only a small portion of the section reached by the Hangchow-Kiangshan Railway has been so served, and that most inadequately. For this reason, agricultural production has been confined principally to materials required for home consumption and those few items which, owing to their nature and value, could warrant an excessive transportation charge, frequently amounting to as much as M$0.50 per ton-kilometer. At the present rate of exchange, this would be equivalent to about G$0.14 per short ton-mile and would yield to the laborer who carries the load on his shoulders from ten to twenty cents (gold) per day.

Personnel

From its inception in 1928, the project has been under the direct charge of Mr. C. Y. Tu, Managing Director and Engineer-in-Chief; with Messrs. Y. Y. Liu as Associate Director; C. Y. Hou, Bridge Engineer; Easin Mao, Mechanical Engineer; and M. I. Wu and Y. W. Pao, Division Engineers in charge of construction. The organization is 100% Chinese, excepting in the matter of education, the Commissioner, Managing Director, Associate Director and two of the Department heads being graduates of Western universities, all but one of which were American institutions.

Nippon Denryoku Kabushiki Kaisha Builds 70,000 kw. Steam Station

(Continued from page 174).

and layout. The completion of foundations, building work, erection of machinery, boilers, etc., occupied about sixteen months. The material used for the building and other structures included 3,000 tons of steel and steel structures, 100,000 meters of electrical cables, 42,000 barrels of cement. The skilled labor employed by contractors was 90,000 man/days, and by the Company 75,000 man/days, and laborers 60,000 man/days, making a total of 225,000 man/days. The maximum number of people employed during one day being 20 staff, 212 skilled workers and 483 laborers.

The total cost of the station including land, wharf, buildings, was Y.10,200,000. The cost of buildings, Y.810,000. Cost of foundations, Y.400,000. Cost of land, Y.530,000.

"The Chemist's Paradise"

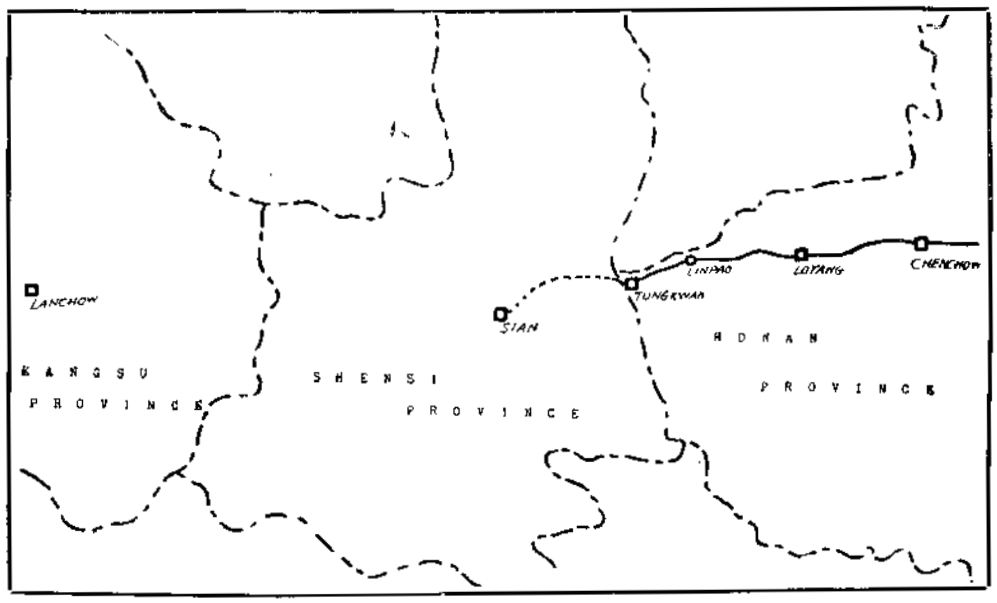
Manchuria is "the industrial chemist's paradise," Professor Ralph H. McKee, of the Department of Chemistry, Columbia University, learns from Mr. Fawn S. Louie, one of his former students. Applying American ideas of efficiency to manufacture at Mukden, Louie, a native Chinese, is doing what the native population regards as "miraculous things" in reclaiming waste products. Steel, enamel, and color, which were imported from Japan for the manufacture of enamel wash basins, are now obtained from local sources, and the scrap steel from stamping out the basins is reclaimed to make soup spoons, cups and other small articles. Copper oxide for coloring the enamels is now made from copper shavings gathered from various brass work shops and from the Government arsenal. The cost of this copper oxide is thirty cents per lb. whereas the Japanese product costs ninety-five cents. Human labor has replaced the machine in some instances because it is not only cheaper, but provides employment, and "keeps the men out of banditry." Women and young girls are employed to inscribe Chinese characters and artistic designs on the enamel wares, and men have been substituted for mechanical jaw crushers. In fashioning by-products, hand-operated machines, a recent innovation, are used to press small articles from waste sheet steel.—*The Chemical Age.*

Extension of Lunghai Railway

A section of the Lunghai Railway from Linpao to Tungkwan was completed in December 1931. This adds 72 kilometers to the railway (826 kilometers) which runs from Haichow, Kiangsu Province to Linpao, Honan Province. Construction work on the new section was started in 1924, or almost seven years ago, but due to the numerous internal disturbances, the work was interrupted many times. The section has five tunnels with an average length of four kilometers each and 30 bridges of an average length of 30 meters each. Judging from the number of tunnels and bridges in such a short section of railway, it is evident that the line passes a very mountainous country. Along the section, eleven stations are constructed, among which Linpao and Tungkwan are the principal ones.

The total cost of the section is reported to be Mex. $9,000,000; derived from the following sources: (1) Mex. $4,450,000 of the Mex. $10,000,000 Construction Loan of 1924; (2) Mex. $940,000 from the Lunghai Railway; (3) Mex. $2,560,000 of the Belgium Indemnity Refund and (4) Mex. $1,000,000 from the Ministry of Railways.

The railway will be further extended to Sian. According to the plan of the Ministry of Railways, this section from Tungkwan to Sian with a distance of 131 kilometers will be completed before July, 1933. Already work has been started on the section of Tungkwan and Hauying, a distance of 24 kilometers from Tungkwan. It is reported that this section was ready for rails in March 1932, and that no less than Mex. $100,000 has been spent for this section.

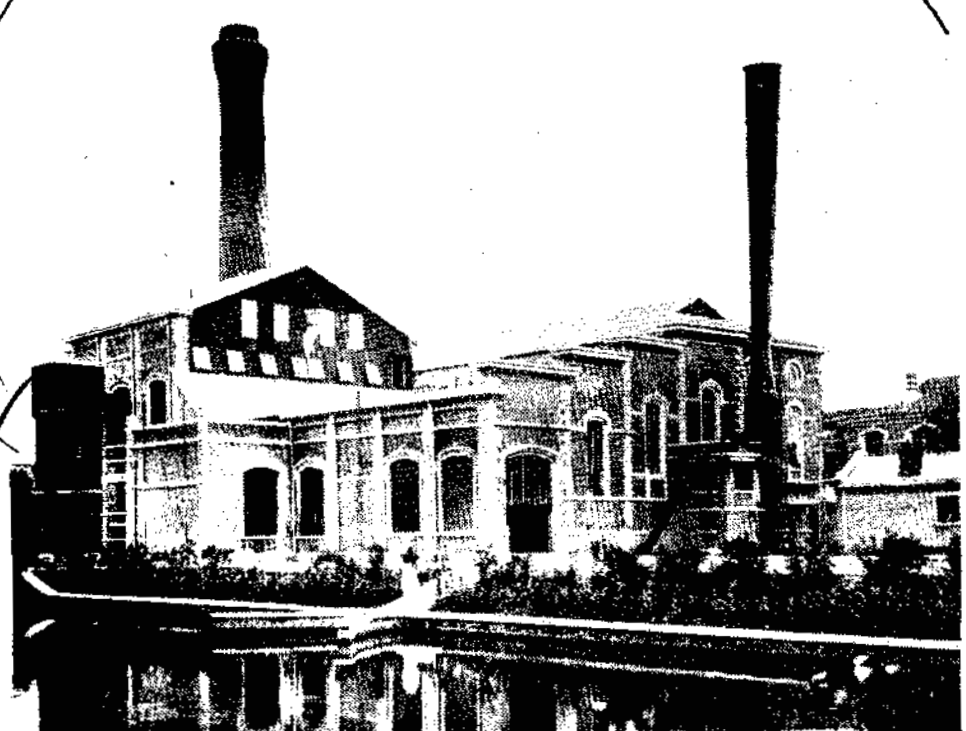


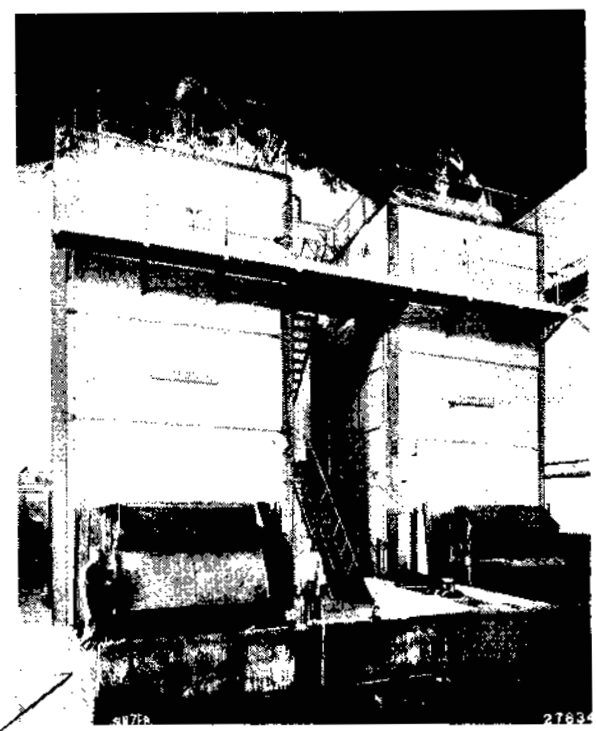
The Lunghai Railway

As estimated by the Ministry of Railways, the sum of Mex. $14,000,000 is needed to complete this section to Sian. Of this sum, Mex. $6,000,000 will be spent for the purchasing of steel rails, bridges, etc. from foreign countries; Mex. $4,300,000 will be spent for the purchasing of locomotives and other wagons; and Mex. $3,700,000 for other construction works.

After the completion of the section from Tungkwan to Sian, the railway will be further extended to Lanchow, capital of Kiangsu Province.

Sulzer Boilers at Tientsin





In the Tientsin electric power station, (L'Energie Electrique de Tientsin), are two Sulzer boilers in service supplying steam for three Brown-Boveri steam turbines with a maximum capacity of 6,500 kw. The single bank upright water-tube boilers, each of 3,000 sq. feet heating surface, work at a pressure of 200 lbs. per sq. inch and are equipped with traveling grate stokers, superheaters, economizers and induced draught fans. Each boiler raises normally 10 tons of steam per hour and can be forced to give 12½ tons, the fuel used being Kailan coal with a calorific value of 10,620 B.Th.U. per lb.

ENGINEERING FINANCE COMMERCE

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BACK TO FIRST PRINCIPLES
"LET US BOYCOTT JAPAN!"
GETTYSBURG—PORT ARTHUR
MANCHURIAN MINING PARALYSED

Vol. XXVIII | MAY, 1932 | No. 5

AVIATION

DUTCH AIR MAIL.—According to the *Telegraaf*, Amsterdam, the directors of the K.L.M., by buying five new Fokker aeroplanes, desire to assure a still greater regularity of the service to the Dutch East Indies than at present. It seems that the various distances on the line to Batavia are too long for planes with a speed of 165 kilometers, especially if the weather is bad. The new planes will have a cruising speed of 200 kilometers, and will thus be able to travel comfortably even if they encounter head winds or bad weather.

NANKING PROJECTS.—A field covering 3,500 mow outside the Tungchi Gate has been chosen as site for a Central Airdrome by the Chinese Aviation Department. $400,000 has been earmarked for the construction of a meteorological station on the peak of Tzechin Mountain. Of this, $30,000 will be fore roads to the station, and the remainder for the purchase of equipment from abroad.—*Eastern Engineering and Commerce.*

LINE IS OPENED.—The Eurasia Aviation Corporation announces that the North-Western line has been inaugurated. Every Friday morning at 7 o'clock, an Eurasia aeroplane will fly from Nanking to Loyang and Peking carrying both mails and passengers.—*Reuter.*

SHANGHAI-BERLIN ROUTE.—The administration of German airways is said to have reached an understanding with the Soviet authorities for the purpose of running the Berlin-Nanking-Shanghai air line via Moscow, Omsk, Turkestan, the Gobi desert and Peking. The line is believed to be put partly in operation in May.—*Havas.*

CANTON MAKE LOAN.—To secure more funds for the development of the Canton Air Force, General Chang Hui-chang, commander-in-chief of the local air fleet, has authorized the issue of premium bonds to the value of $5,000,000. It is expected that the first drawing has been fixed for September 1. The air authorities are planning to build up a strong fleet for national defence with particular reference to the security of Canton and its environs.

RAILWAYS

KIAOCHOW-TSINAN EXTENSION.—A number of branch lines will be built to connect with the Kiaochow-Tsinan Railway, the object being to earn enough revenue for the redemption of the railway from the Japanese. The first line to be built runs from Tsinan to Taokow, a distance of 100 kilometers. The estimated cost is $6,000,000, but half of this can be saved by using the 60-pound rails and bridge-building material taken from the main line, while the balance of the cost will be met from the British portion of the Boxer Indemnity. As to rolling-stock, requirements can be supplied from the main line. The second proposed line, 200 kilometers, is from Poshan to Tawenkow, connecting with the Tientsin-Pukow Railway. This zone is rich in coal deposits. The cost of this line, however, will be exceedingly high, as some mountainous country has to be crossed. A third line under consideration is 30 li long, extending from the Poshan colliery to the railway. Between these two points a light railway is now operated.

NEW RAILWAYS IN JAPAN.—The following electric railways have recently been chartered:—Doyko Electric Railway from Abuta-mura, Abuta-gori, Iburi, Hokkaido to Higashi-Kuchiyasu-mura (42 km.); Nimobiki Electric Railway (8 km.), between Mita-Mimaki-mura, Kita-Saku-gori, Nagano-ken, and Honmoku-mura, at a cost of Yen 300,000; the Keihan Electric Railway (2 km.), between Senri-mura, Mishima-gori, Osaka-fu, and Yamada-mura (Yen 600,000); the Toshima Seacoast Railway (20 km.), between Shikaba-mura, Kayabegori, Kokkaido, and Usnjiri-mura (Yen 1,110,000); and the Kochi-Gamon Railway (16 km.), from Shioye Kochi City (Yen 632,734). *Eastern Engineering and Commerce.*

FERRY ACROSS YANGTZE.—An agreement has been signed between the Chinese Ministry of Railways and the Trustees of the British Boxer Indemnity for a loan of £400,000 sterling, for the construction of the railway ferry across the Yangtze River connecting Pukow with Hsiakwan, Nanking, the materials for which will be imported from Great Britain.—*Eastern Engineering and Commerce.*

MOSCOW BUYS LOCOMOTIVES.—Soviet Russia laid 8,000 miles of track in 1930 and 1931, is now electrifying its railroad system extensively and expects to order 3,000 more locomotives from the United States between now and the coming summer, said Charles A. Gill, superintendent of motive power of the B. & O. Railroad, when he returned from Europe to the U. S. Mr. Gill sailed for Russia, February 10, 1931, at the head of 150 American experts to assume, at the invitation of the Soviet Government, the position of consulting chief of its railroad service. Russia has 50,000 miles of track laid at present and 17,000 locomotives, he said, and the Government expects to lay several thousand more miles of track in 1932.

WORK ON JAPANESE LINE.—The modernization of the Tokaido line of the Japanese Government Railways will be completed within the year, it has been learned, with an expenditure of Yen 780,000, terminating the seven year program of improvement inaugurated in 1925, with a total estimate of Yen 14,400,000. With the completion of approximately 52 kilometers remaining at present, the whole track will be laid with 100 lb. rails. It is expected that the heavier rails will diminish the vibration of the coaches, increase the speed of the trains, making for greater safety and increased transportation capacity. The first 24 meter length rails will be also laid for a distance of one kilometers between Tenryu river and Hamamatsu. These rails are twice the length of the common rails in Japan. They are expected to diminish the vibration of the trains and to reduce the cost of maintenance, due to the reduction of the number of joints by half.

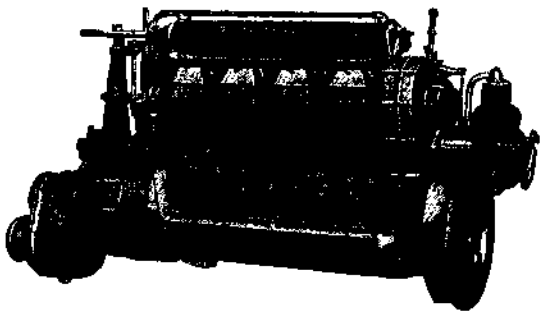
MINING

CHINESE SULPHUR MINES.—The opening and development of sulphur mines in Hunan, Honan and Shansi, is being considered by the Chinese Ministry of Industry. It is learnt that mineralogists will shortly be sent to the three provinces for prospecting purposes. Plans are being drafted by the Ministry for the operation of such mines on a commercial basis.—*Kuo Min.*

MANCHURIAN GOLD.—Several Japanese experts on placer gold mining are to be sent to investigate prospects for mining in Manchuria by the Ministry of Commerce and Industry shortly. The group will consist of eight engineers and five assistants, from the Geological Laboratory of the Ministry, and the appropriation of Yen 80,000 to finance the investigations has been requested. According to research by the South Manchuria Railway Company and also by officials of the Government, the gold deposits in the upper parts of the River Amur and the River Sungari may be worth as much as Yen 2,000,000,000.

COPPER DEPOSITS.—A geological survey group headed by the Leningrad geologist, M. Serpukhov, has discovered rich deposits of copper ores in the Okhotsk-Udsk district of the Far Eastern Region. These deposits are reported to extend over an area of 20 square kilometers.

GLENIFFER



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PROBING THE HOOVER DOCTRINE
THE HOOVER NON-RECOGNITION DOCTRINE
MANCHUKUO
AMERICA'S HUMILIATION IN 1905
NEARING THE CLIMAX
RIDING THE PHILIPPINE TIGER

Vol. XXVIII | JUNE, 1932 | No. 6

Great Industrialist Passes

LI SHI-MING, the "grand old man" of Tangshan, the industrial center of North China, has passed away, and with him an outstanding man, of great ambition and ideas regarding development of industry in China, possessed at the same time of the courage, foresight and skill to carry out those ambitions and ideas. He realized long before most of his country-men that the future of China, unable to resist Western influence, would largely have to be based on industrial development and that intimate co-operation with foreign capital and technical experts was necessary and desirable in order to accelerate such development. He understood that economic issues are of endless more importance than political issues, and it was with ever increasing disappointment that he observed the stress laid in this country on the latter.

He was born in Tientsin, and educated in the Peiyang Military Academy where he completed a military course and afterwards studied railway engineering. After graduation he was at first employed by the Chinese Engineering and Mining Co., and was then appointed professor at the Nanking Mining and Railway School, where he only stayed for a short time, however, after that returning to the Chinese Engineering and Mining Co.

In 1898 he was appointed manager of the Tangshan Cement Co. and it was especially to the development of this Company—in 1906 transformed into the Chee Hsin Cement Co.—that he devoted his life, being at the time of his death its managing director.

When he took charge of the cement works the yearly output was only 50,000 bbls. of cement with a power plant of 125 kw., while to-day the output of the Works—the biggest in China and one of the biggest in the whole of the Far East—is 1,600,000 bbls. of cement per year, with a power plant of 16,000 kw., figures that show the development better than words.

It was also owing to his initiative that the Chee Hsin Cement Co. took over the management of the Hwa Kee Cement Works, Tayeh, Hupeh Province, in 1914.

His name will remain connected also with the development of the coal industry in the Kaiping coal field. He was made assistant manager of the Lanchow Mining Co. when that company was started as a competitive enterprise to the foreign managed Chinese Engineering and Mining Co., and after the amalgamation of these two companies into the Kailan Mining Administation he became a member of the Board of Directors, being chairman at the time of his death. As spokesman for the Chinese interests his broad-minded point of view, goodwill and ability of negotiation contributed very much to the development of this model administration.

The Hwa Hsin Spinning and Weaving Mill in Tangshan owes its existence and development to his initiative, and to a considerable extent this also applies to the Yao Hua Mechanical Glass Co., Chinwangtao.

He made at various times trips to European countries for studying industrial conditions, which largely broadened his outlook.

His loss is felt by numerous friends, Chinese and foreign, and his name will always remain associated with Tangshan and the industrial development there.

Li Shi-ming

The Canton-Hankow Railway

THE Chinese Ministry of Railways has taken definite steps to complete the construction of a 270 mile gap in the Canton-Hankow Railway. It is expected that the first section of 29 miles from Shiuchow to Lochang will be finished this summer, when construction of the second section of 30 miles from Lochang to Pingshih, for which the survey has been completed, will be started. Survey work has been started also on three other sections, totaling 211 miles and extending from Pingshih to Chuchow.

Arrangements are being made to obtain funds from the British Boxer indemnity refund, and the principal materials and equipment for the completion of this work will therefore be purchased from British manufacturers. For the completion of the first section from Shiuchow to Pingshih approximately $564,000 (at par exchange) is required ; to cover this a loan of £170,000 has been provided from the British Boxer indemnity fund.

The total cost of the entire construction is estimated at about $12,000,000 (at par exchange) for which it is planned to obtain further Boxer indemnity funds as the work progresses.

The completion of this railway will open up another important and urgently needed artery of commerce. Authorities in Canton, recognizing the necessity for this railway and discouraged over the slow progress made on its construction, have been active in building a motor highway to fill the gap. Most of its sections have already been completed, but modern concrete bridges over the various streams are still to be constructed.

When the highway is completed it will be possible to proceed from Canton to Hankow in approximately five days, making use of the two sections of railway and filling in the gap by motor transport.—*Commerce Reports.*

Radio in China

Another step towards the development of radio communications in China has been made with the erection of a radio broadcasting and receiving station by the Ministry of Railways at Nanking. Already direct communications are being maintained with the various Railway Administrations, in the principal cities.

The Ministry of Communications, it is learnt, is also taking steps to expand its international radio service. A powerful installation has been ordered from the British Marconi Company.—*Kuo Min.*

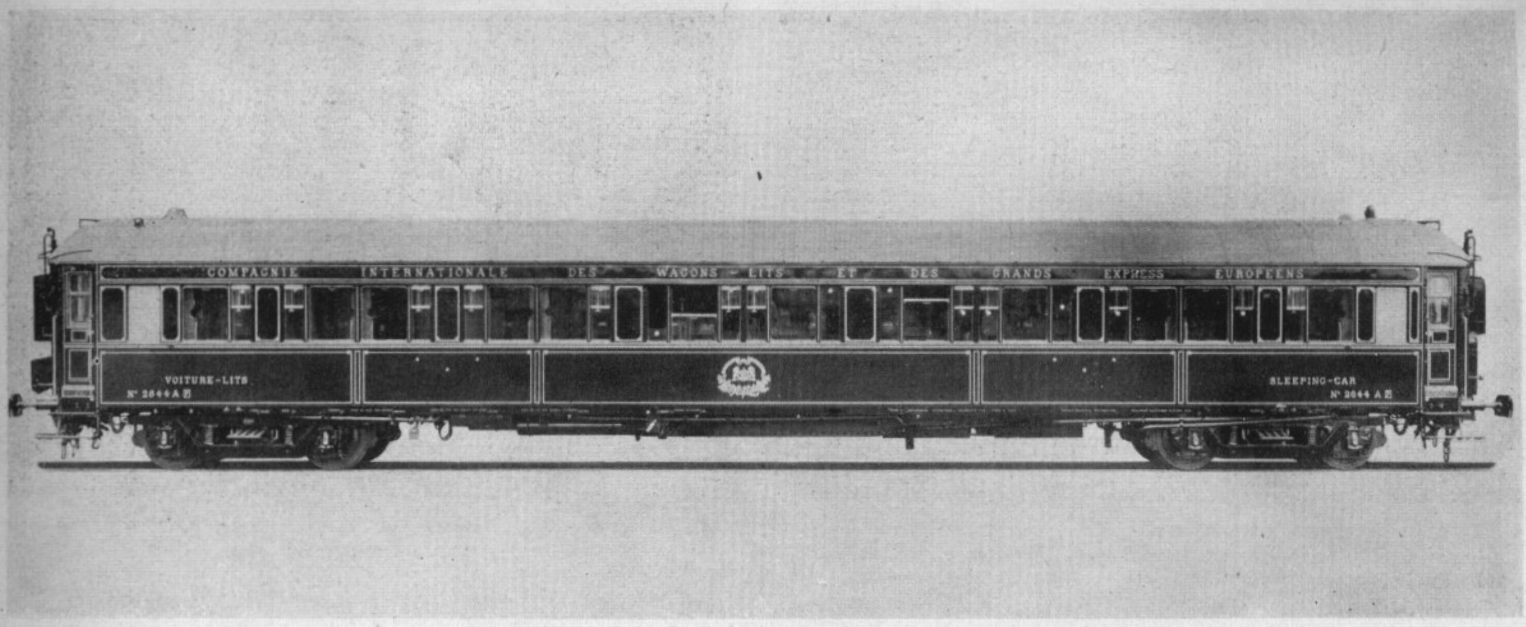


Fig. 5.—First class Steel Sleeping Cars for the celebrated Blue Trains, Compagnie Internationale Des Wagons Lits. Built by the Metropolitan-Cammell Carriage, Wagon and Finance Co. Length 77 feet

and the London offices are at Vickers House, Broadway, Westminster. Views of the interiors of some of the shops situated at different Works belonging to the Company are shown in the accompanying illustrations. (See Figures 1, 2, 3 and 4).

The Company has designed and built rolling stock bridge work and equipment for the Chinese railways through the whole period of railway development in China and in a future article illustrations of different types of rolling stock supplied will be presented. At the present the Company is building for the Chinese National Railways 70 all-steel bogie covered goods wagons of 40,000 kilos capacity and six spans of bridge work.

In conjunction with the Sentinel Waggon Works, Ltd., the Company has developed the

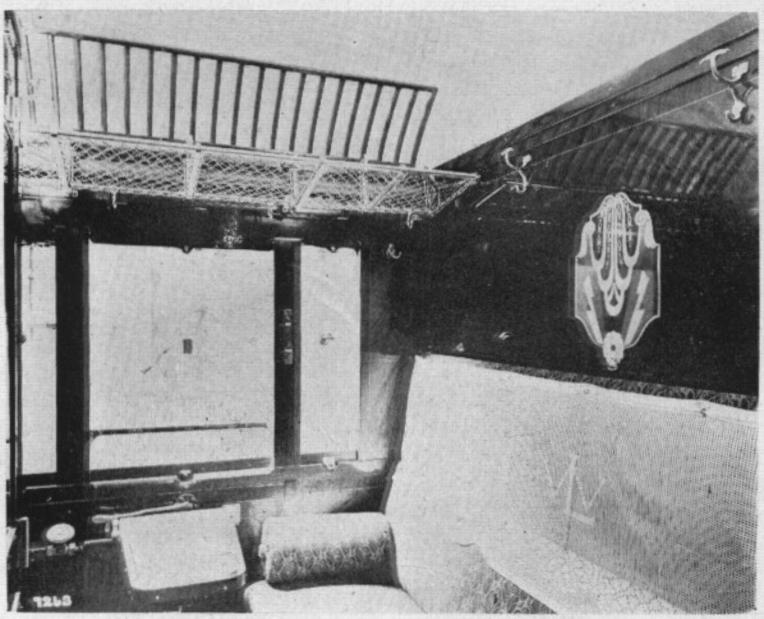


Fig. 9.—Interior of compartment as arranged for day service in Sleeping Cars built for the International Sleeping Car Co., by the Metropolitan-Cammell Carriage, Wagon and Finance Company, Limited, England.

Sentinel-Cammell gear driven steam railcars, which have proved such a success. These railcars have been supplied to railways in no less than forty-four countries throughout the world and the demand for these railcars is continually increasing. These railcars have been developed from small single cars to large articulated cars of more than 250 horse-power carrying one hundred and fifty passengers and built to meet the most modern transport requirements. At the present time the Company is building eight of these railcars for the Roumanian State Railways, some of these being of 250 horse-power. Also a number of 200 horse-power railcars are being produced for the London and North-eastern railway system.

The Company owns its won steel works and rolling mills at the Patent Shaft Works

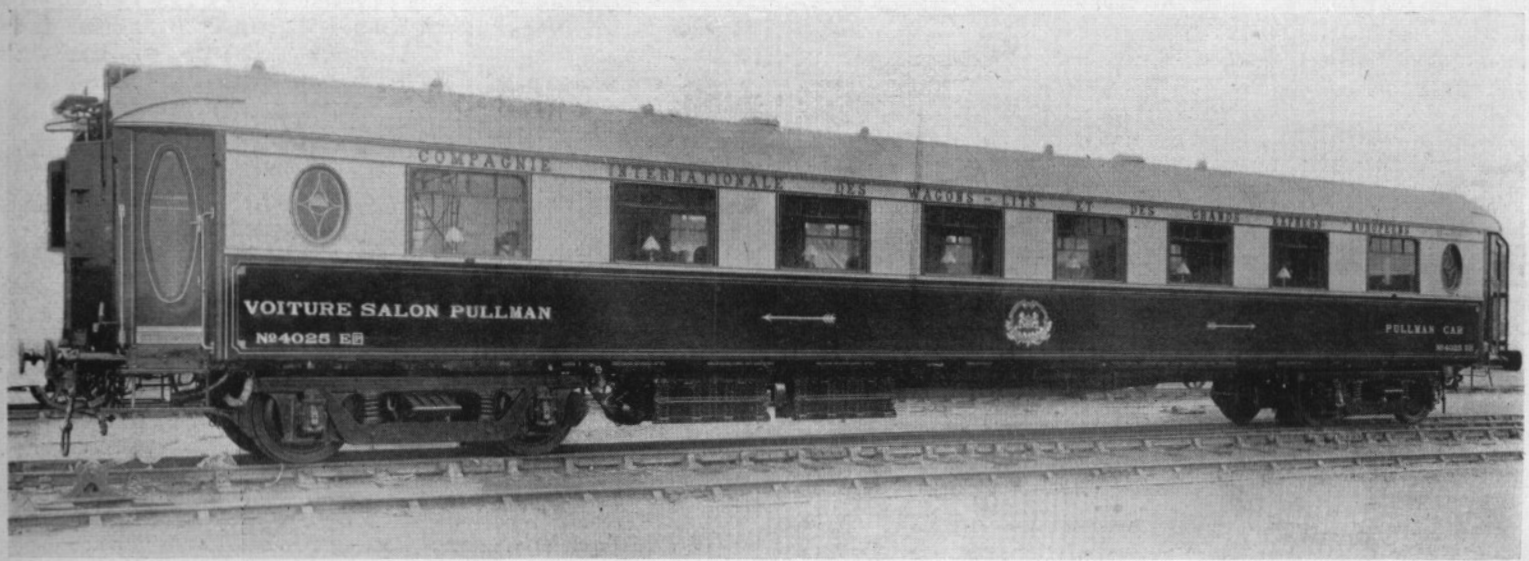
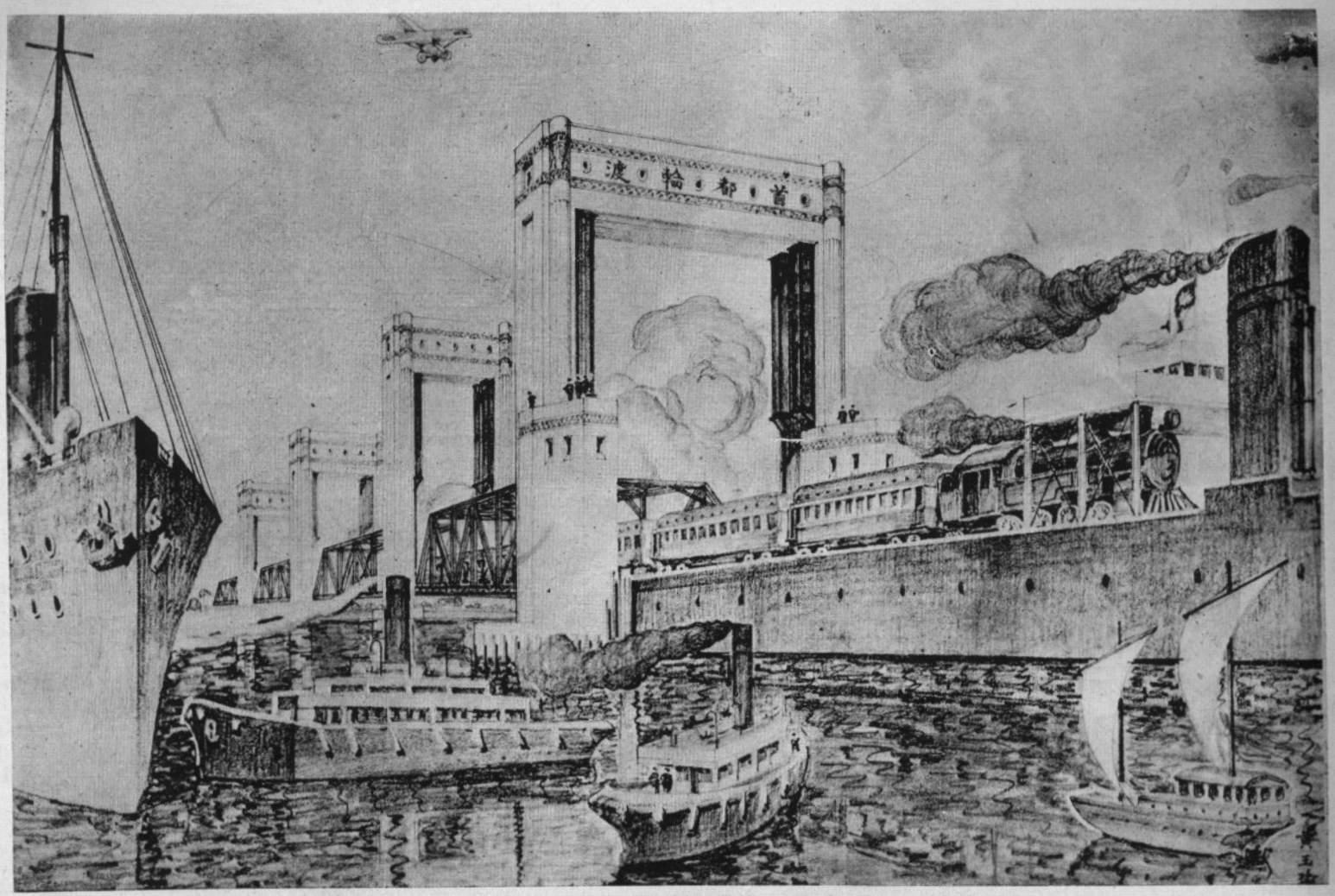


Fig. 6.—First class Steel Pullman Cars for The Golden Arrow Expresses, Compagnie Internationale Des Wagons Lits. Built by the Metropolitan-Cammell Carriage, Wagon and Finance Co., Ltd., Length 77 feet



Drawing showing Appearance the Nanking-Pukow Train Ferry will Present

The Nanking-Pukow Train Ferry

Project Being Carried Out with Boxer Funds Includes Building of Twin-Screw Steamer and Construction of Bridge Approaches

UNDER contracts that have been made through the London Boxer Funds Purchasing Commission the project of establishing a train ferry service linking Nanking and Pukow across the Yangtze is to be carried out in coming months. The work will include the erection of two approach bridges and the building of a modern train ferry steamer.

The contract for the bridge approaches is to be carried out by Messrs. Dorman, Long & Company Ltd., of Middlesbrough and London for whom early negotiations in connection with the project were carried out in China by Messrs. Arnhold & Company. The contract for the building of the train ferry steamer has been placed in the hands of Messrs. Swan, Hunter and Wigham Richardson, Ltd. of Newcastle-upon-Tyne for whom negotiations in China were conducted by Messrs. Malcolm and Company, Ltd., acting as agents for the shipbuilders.

Each of the two bridge approaches that will be erected will consist of four spans (totalling eight spans altogether) each 152-ft. long with 20-ft. between trusses, with the exception of the last span in each case which flares out to 44-ft. They will contain approximately 1,500 tons of steelwork all of which is to be rolled and fabricated from Dorman, Long's own raw materials at the Company's Works at Middlesbrough.

The Yangtze River at the ferry site has an extreme variation in water level of 24-ft. with a daily variation of 1-ft. to 3-ft. The four spans which connect the ferry boat to the shore on each bank are to be carried on long screws, electrically operated, which will be so interconnected that, whatever the water level there may be an even gradient produced over all four spans from the start of the first span down or up to the outer end of the fourth span.

The ferry boat is connected to the end of the last span on each side of the river by an adjustable " apron " which will take up any minor variations in level of the ferry deck when loading relative to the end of the fourth span.

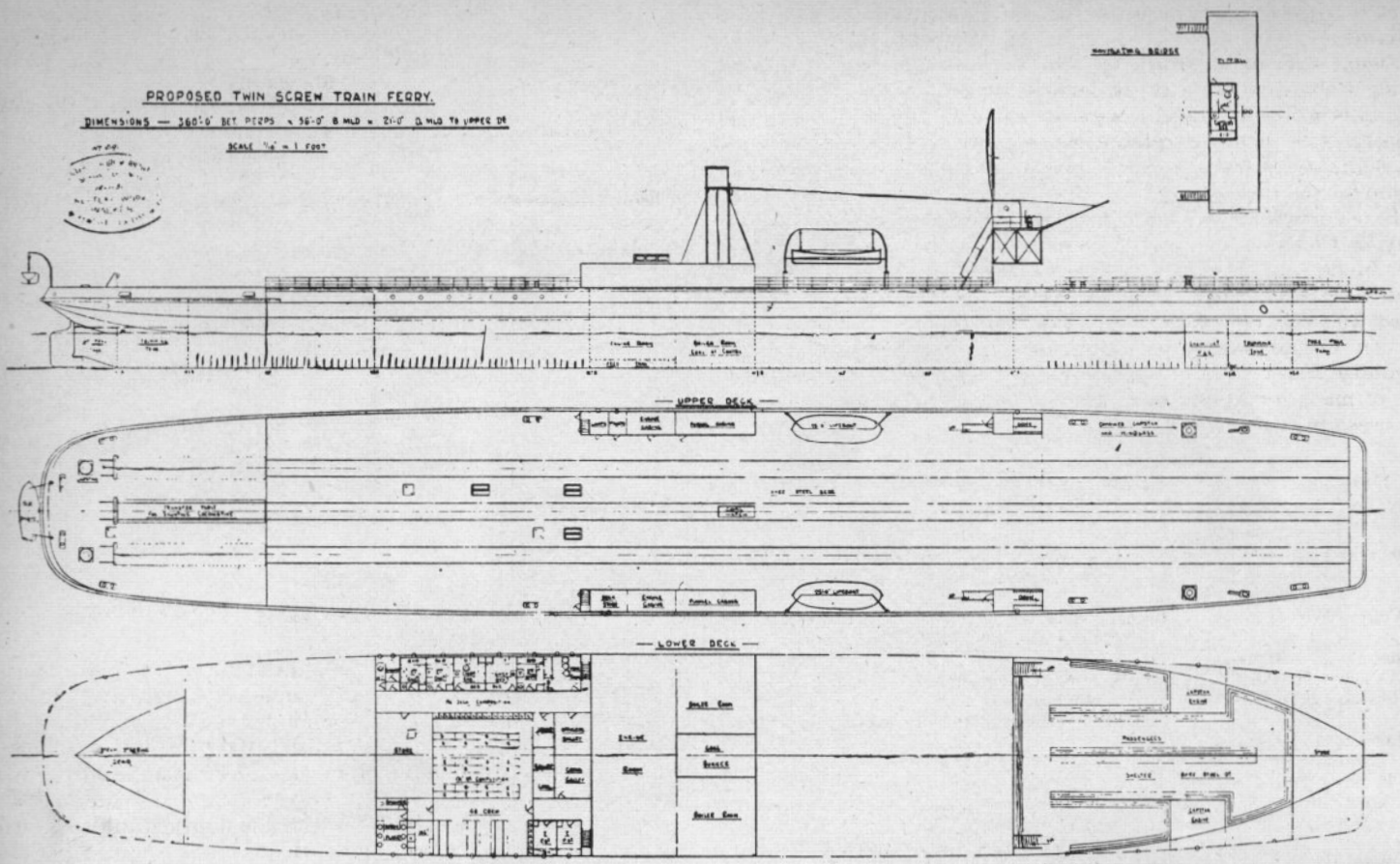
The electrical and mechanical gearing will be supplied by Messrs. Thos. Broadbent & Sons, Ltd. of Huddersfield.

At the time negotiations in connection with the bridge approaches were being conducted in China by Messrs. Arnhold & Co., Mr. Freeman, the chief bridge designer for Messrs. Dorman, Long & Co., visited this country. Mr. Freeman was responsible for the design of the famous Sydney Harbor Bridge and will shortly be visiting China again in connection with business interests of his Company and other well-known British manufacturers.

The chief engineer of the Nanking-Pukow Train Ferry is Dr. Cheng Hua of the Ministry of Railways, Nanking, who recently paid a flying visit to England and is now on his way back to China.

The twin-screw ferry steamer designed to transport passenger and freight trains over the Yangtze between Nanking and Pukow is to be built under the supervision of Sir John H. Biles & Company of London at the Neptune Works, Walker of Messrs. Swan, Hunter and Wigham Richardson.

The principal dimensions are about 371-ft. overall, an extreme breadth of 58½-ft., with three clear lengths of car track each 300-ft. long on the upper deck. The ship is designed to carry a total live load of about 1,200 tons, and a total dead-weight of almost 1,600 tons.


PROPOSED TWIN SCREW TRAIN FERRY.
DIMENSIONS — 360'-0" BET PERPS × 56'-0" B MLD × 21'-0" D MLD TO UPPER DK
SCALE ⅛" = 1 FOOT
UPPER DECK
LOWER DECK

The hull and machinery will be built under special survey, and in accordance with Lloyd's requirements.

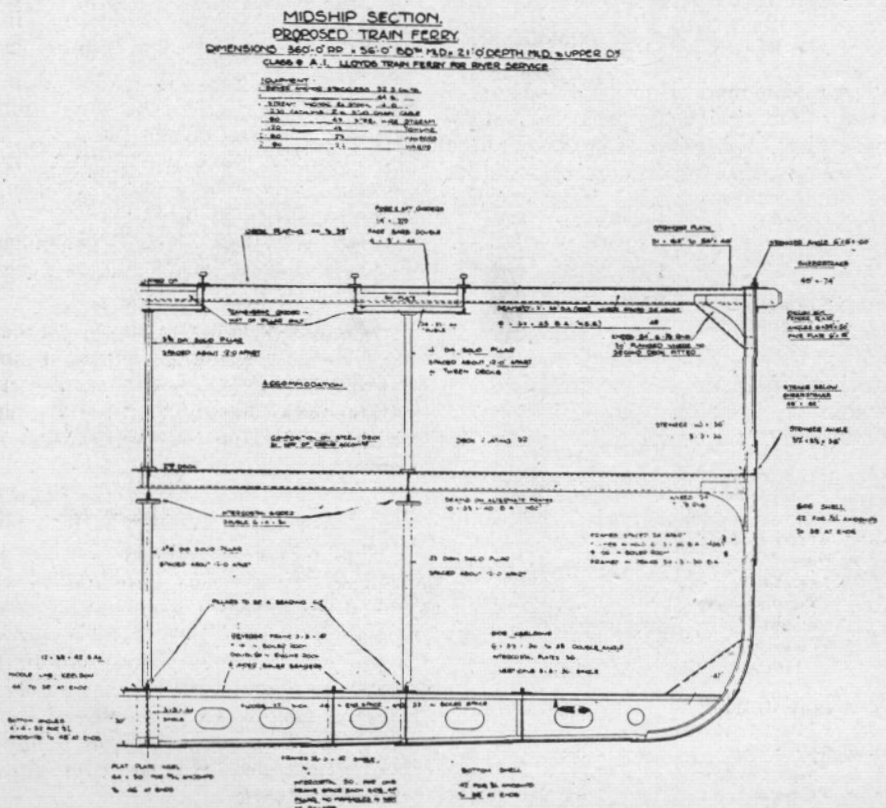
The cars will be shipped from the forward end, and accommodated on three lines of rails on the upper deck, taking in all three trains each of seven wagons, a total of 21 wagons. The shunting of the wagons will be by means of a locomotive carried on a platform at the after end of the upper deck in conjunction with traversing gear, by means of which the locomotive may be moved horizontally across the deck to enable it to operate on any of the three lines of rails. At the after end of this deck, and in line with each car track, substantial buffers will be built.

Propelling Machinery

The forward end of the upper deck will be recessed in an athwartship direction to receive a hinged apron, which, in its working position, will be flush with the upper deck, connecting the railway track on the shore with the three lines of tracks on the deck of the ferry.

To facilitate berthing there is, in addition to the after steering arrangements, a bow rudder with its independent steam steering gear for use in manoeuvring in and out of the berthed positions.

The propelling machinery is amidships with the casings arranged at the sides of the upper deck, and a coal bunker arranged in a recess between the two boilers. The hull is exceptionally well subdivided by watertight bulkheads extending to the height of the upper deck.


MIDSHIP SECTION,
PROPOSED TRAIN FERRY
DIMENSIONS 360'-0" PP × 56'-0" BOA MLD × 21'-0" DEPTH MLD to UPPER DK
CLASS ✠ A.1. LLOYDS TRAIN FERRY FOR RIVER SERVICE

Feed water will be carried in a cellular double-bottom tank under the engines. The forward and after peaks will be arranged for water ballast, and, in addition, there will be deep tanks for trimming both forward and aft, and heeling tanks on the port and starboard sides amidships.

Substantial fenders are fitted at the level of the upper deck, and similar fenders are carried round the bow and stern.

The navigating bridge is mounted at a level giving a commanding view above the trains, and extends the full width of the ship, and the captain's accommodation is fitted on this bridge.

The accommodation for the officers, engineers and crew is arranged on a steel lower deck or flat aft of the engine room.

A shelter is provided on the lower deck forward for passengers' use.

Deck Machinery

The deck machinery includes steam steering gears of the Wilson Pirrie type both forward and aft, both gears controlled by telemotor from the navigating bridge, two steam capstan windlasses forward, two warping capstans aft, steam-driven traversing gear, electric lighting throughout the ship, including flood lights for the car deck, and steam heating throughout the living accommodation.

The twin propelling engines will be of the three cylinder, triple-expansion, surface-condensing type, with independent air, circulating, feed and bilge

pumps, together with the usual ballast, general service and other auxiliaries.

Steam will be supplied by two single-ended Scotch boilers, burning Chinese coal, with Howden's system of forced draught. The boilers will be arranged in separate stokeholds, one port and one starboard, with separate uptakes and separate funnels, this arrangement being necessary in order to give a clear space in the center of the ship for the trains.

Expenditure for this train ferry project is only a portion of the outlay in China within recent months from the remitted British Boxer funds. In this connection a statement of expenditures from the British Boxer funds is of interest and is given below. From August 10, 1931 to March 18, 1932, the Chinese National Construction Commission made purchases in England with Boxer Indemnity funds amounting to £104,443 12s. 9d. The different kinds of machinery purchased, their prices, the manufacturers and their uses are given as follows:

Material	*Net Price (Pounds Sterling)*	*Manufacturer*	*Material required by*
	£ s. d.		
Service Watthour Meters	4,711.12. 6	General Elec. Co.	Capital Elec. Wks.
do.	1,829. 9. 4	do.	Tsishuyen Elec. Wks.
Bare Copper Wire ..	389. 6. 4	British Insulated Cable Co.	do.
Weather-Proof and Rubber Covered Wire ..	1,238. 0. 8	W. T. Henley's	do.
Distribution Transformers	4,175.10. 2	Crompton Parkinson	Capital Elec. Wks.
Weather-Proof and Rubber Covered Wire ..	835.19.10	W. T. Henley's	do.
Elec. Battery Truck and Charging Plant ..	1,053. 0. 0	Electricars Ltd.	Tsishuyen Wks.
Submarine Cable and Accessories	992.14. 0	Callenders Co.	Capital Elec. Wks.
Surge Absorber	108. 4. 6	Ferranti	do.
do.	315.18. 0	do.	Tsishuyen Wks.
Frequency Changer Set ..	4,848. 3. 9	Metropolitan-Vickers	Capital Elec. Wks.
Double Cotton Covered Wire	475. 6. 2	W. T. Henley's	Govt. Elec. Wks.
Locomotives	2,725. 0. 0	W. G. Bagnall	Kwei-Nan Coal Mine
Coal Wagons	7,272.11. 0	Charles Roberts	do.
Nickel-Chromium Resistance Wires	184. 2. 5	Henry Wiggin	Govt. Elec. Wks.
Power Transformers ..	1,506. 7. 6	Metropolitan-Vickers	Tsishuyen Wks.
Evaporating Plant, Coal Conveying Plant, Boilers and Feed Pumps ..	16,572.16. 0	Babcock and Wilcox	Capital Elec. Wks.
Motor for Operating the above	813. 0. 0	do.	do.
Black Diamonds for Mining	52.10. 0	Van Moppes	Kwei-Nan Coal Mine
Steel Channels	207.10. 2	Frodingham	do.
Steel rails	547. 0. 3	British Iron and Steel Co.	do.
Steam pipes	2,108. 0. 0	Babcock and Wilcox	Capital Elec. Wks.
Creed Keyboard Perforator	378. 8. 1	Creed & Co.	Govt. Elec. Wks.
Substation Equipment ..	1,494.17.11	English Elec. Co.	Capital Elec. Wks.
Tin Plates	14,062.10. 0	Brooker Dore	Govt. Elec. Works
Steel Sheets and Corrugated Sheets	16,724.18. 5	Fredk Braby	do.
Tin Plates..	2,875. 0. 0	Brooker Dore	do.
Tin Plates..	14,000. 0. 0	do.	do.
Nickle-chromium Resistance Wires	178.15. 0	Henry Wiggin	do.
Cotton Covered and Enamelled Wires ..	1,358.18. 8	Concordia	do.
Hand Lifting Pulley ..	8. 9. 8	Tangyes	do.
8½″ Centers Lathe ..	197. 8. 3	Smith Barker and Wilson	do.
High Speed Planning Machine	203.15. 6	Alfred Herbert	do.
Vertical Slotting Machine	121.17. 6	Wm. Muir	do.
Surface Grinding Machine	212.11. 0	Associated Brit. Machine Tool Works	do.
Hack Sawing Machine ..	41. 8. 3	Edward G. Herbert	do.
Motor Driven Air Compressor	86. 9. 5	Lacy Hulbert	do.
Punching and Shearing Machine	117.19. 6	Rice & Co.	do.
Elec. Heating Furnace ..	123. 6. 9	Alfred Herbert	do.
Portable Elec. Welding Set	187.18. 8	Murex & Co.	do.
Hand Screw Press ..	140. 7. 6	John Hands & Co.	Govt. Elec. Wks.
6¼″ Turret Lathe ..	227.16. 8	Associated Brit. Machine Tool Works	do.
Silicon Steel Sheet ..	303.15. 8	Joseph Sanky & Sons	do.
Insulating Materials ..	23.14.10	Metropolitan Vickers	do.
do. ..	183.10.11	Micanite and Insulators Co.	do.
do. ..	64.11.11	Wilkinson Heywood & Clark	do.
Fix Tyre Coal Chute ..	308. 7. 6	Babcock and Wilcox	Capital Elec. Wks.

Highway Building in China

In the Province of Fukien, 30 miles of the 80-mile Chanchow-Lungyen road have been completed. Surfacing has been practically finished on the remaining portion of the road, and the bridge work is being expedited. Of the 43-mile Lungyen-Changping branch road, 13 miles have been completed. Progress has been made also on the Lungyen-Engteng road toward the Kwangtung border; a 20-mile stretch is finished and soon will be opened to traffic. A 53-mile section of the Changchow-Chaoan road, from Changchow to Changpu, has been opened to traffic; on a further 20-mile section of this road additional work must be done.

Provincial authorities in Shensi Province have made a determined effort since May, 1931, to improve existing highways formerly built with military, farm, or famine labor. A severe famine in the Wei River basin during 1930 increased the need for better means of communication, as famine relief authorities found themselves greatly handicapped in transporting food supplies.

The China International Famine Relief Commission spent $250,000 (Chinese silver) on highway construction during 1930, improving 200 miles of roads, cutting down grades of 12 and 18 per cent to 7 per cent, repairing 18 bridges, installing culverts, relocating two routes, and rebuilding over 70 miles of roads. Employment was afforded to more than 10,000 laborers.

Provincial highway construction efforts during 1931 were chiefly centered upon the improvement of the main trunk road from the terminus of the Lung-Hai Railway at Tungkwan on the Honan border, westward to Sian, the provincial capital of Shensi, and then in a north-westerly direction to connect with the Province of Kansu. In the fall of 1931 an American tractor and road graders, purchased by the provincial authorities, were put into operation on the Sian-Tungkwan highway, with much benefit to the road.

Completed motor highways in the Province of Shensi approximate 878 miles. Their effect in increasing the use of motor vehicles is told by the fact that on January 1, 1931, only 79 vehicles were in operation in the Province, whereas on January 1, 1932, it was estimated that 235 were in use, of which 199 were trucks and busses.

Highway Program

The highway program of the Shensi provincial government provides a three years plan for the construction of approximately 3,000 miles at an expenditure of $300,000 (Chinese silver). The work done during 1931-32 is a part of this program. Highways planned in addition to those now under improvement, when funds become available, are: The Si-Han road from Hanchung to Chengkui, 247 miles; the Si-Yu road from Yulin to Suiteh, 378 miles; the Si-King road from Kingtzekwan to Lungchuchao, 203 miles; and the Si-Hin road from Hingan to Sunyang, 228 miles.—*Commerce Reports.*

New Railways Will Aid Manchurian Development

Kadono Points Out How Construction of Branch Lines Will Open Vast Territories to Agricultural and Industrial Exploitation—Finance One of Greatest Problems but Investments in Transportation Seen Certain to Pay

By CHOKIURO KADONO, Partner in the Firm of Okura, Tokyo; Member of American Society of Civil Engineers, New York; Member of Iron and Steel Institute, London

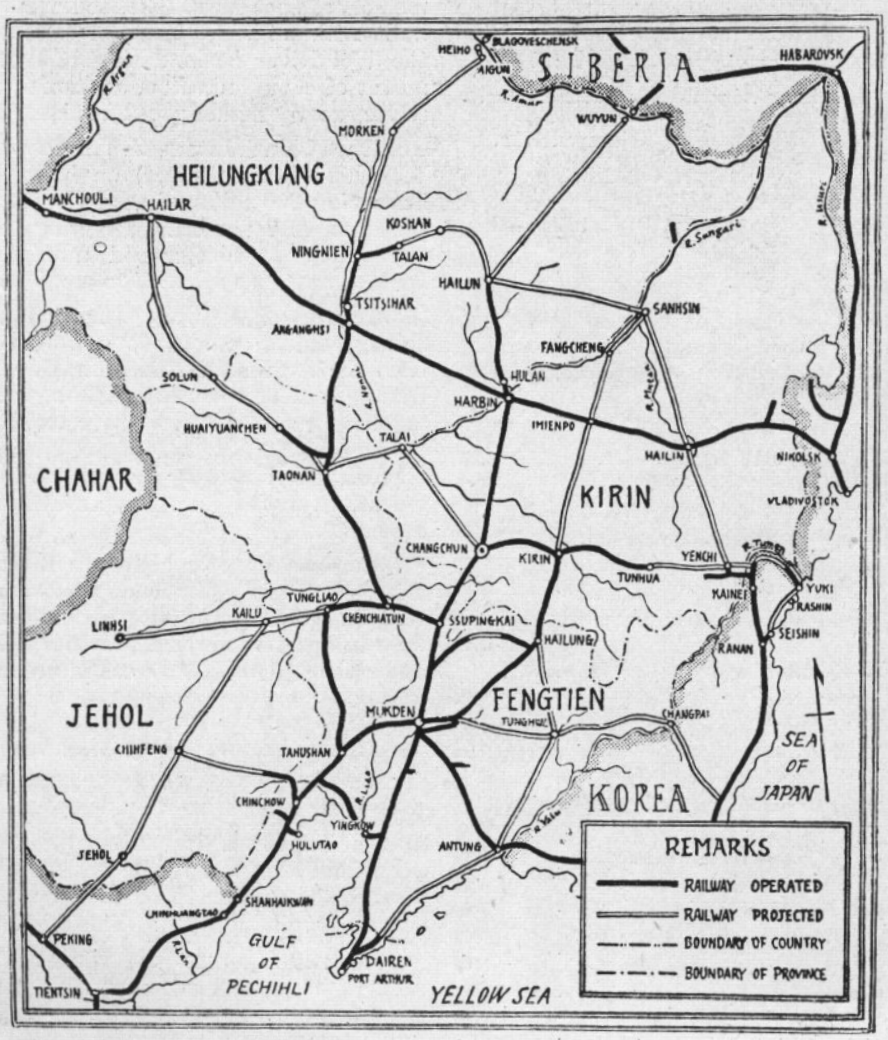
THE vast area of Manchuria has 3,855 miles of railways in operation, while the vaster and huge area of China has only 4,483 miles. How much better off Manchuria is over China, and yet Manchuria is a new country with recent immigrants with little culture and traditions, while China has them in super-abundance, although with them all, her lot has been a most unfortunate and deplorable one for the last few decades. And what a contrast between the inhabitants of China and of Manchuira, this last area with mixed races of Manchu, Chinese, Korean and Japanese, in regards to their fortunes of life.

The causes are not far to seek. The Japanese influence has kept Manchuria partially free from the evils from which China proper has been unable to free herself. Railways built and operated by the Japanese and Russians, together with those built and operated in a sort of way by the Manchurian officials mostly with loans from Japan and with their own funds have given impetus for farming and trading, export and import.

With these 3,855 miles of railways in operation to-day in Manchuria, the two ports of Dairen and Vladivostok as the termini of the South Manchuria Railway and the Chinese Eastern Railway cannot be sufficient to serve the growing population and production in view. Manchuria requires more railways and more sea-board outlets. The port of Newchwang (Ying-kow) at the mouth of the Liao river is a summer port and being tidal with bars has not been satisfactory and has lost the importance of former days. The branch line serving this port from Koupangtzu on the main line of the Mukden-Shanhaikwan-Peking Railway has been a somewhat round-about route to serve the fertile plains of Manchuria.

The data below show the growth of Manchuria during the past 20 years:

	1907-8	*1929*
Foreign trade through Dairen (Taels) ...	52,727,000	755,225,000
Exports from Manchuria of beans, bean-cakes, bean oil ... ... (Tons)	1,732,000	4,721,000
Coal output ... ... (Tons)	233,000	7,032,000
Agricultural products ... (Bushels)	404,493,000	876,092,000
Cultivated areas ... ...(Acres)	17,788,000	30,744,000
Traffic on S.M.R.:		
No. of passengers	1,512,000	10,410,000
Goods ... ... (Tons)	1,486,000	20,461,000
Shipments at Dairen port:		
No. of vessels arriving	1,143	4,925
Goods loaded and discharged (Tons)	919,900	9,940,000



The railways now operating in Manchuria are as follows and are shown in heavy lines on the Map:

	Miles
1. South Manchuria lines	690
2. Chinese Eastern lines	1,079
3. Mukden-Shanhaikwan lines ...	428
4. Mukden-Hailung-Kirin lines ...	313
5. Changchun-Kirin Tunhua lines ...	211
6. Ssupingkai-Taonan-Tsitsihar-Koshan lines (including Solun line)	613
7. Harbin-Hailung line	138
8. Chengchiatun-Tungliao-Tahushan lines	228
9. Chinfu railway from Chinchow (near Dairen) to Chengtzeteng ...	63
10. Other Minor lines	92
Total	3,855

Manchuria thus is served by 3,855 miles of railways and it might

be of interest to see how these lines were financed and operated :

	Per cent
1,461 miles built with Japanese funds	38
1,119 miles built with Russian funds	29
884 miles built with Manchurian funds ...	23
391 miles built with British funds	10

Without going into detail about the financing of these lines, one can readily see what Japan and Russia have done toward the development of Manchuria.

The lines built with Manchurian funds are comparatively new and their management has not been what it should be. Travellers can judge relative efficiency by looking at the upkeep of the roads and their rolling stocks.

The railway gauges of these lines are the standard four feet 8½ inches on Japanese and Manchurian lines, while the Chinese Eastern is five feet. That there are these two gauges is unfortunate from traffic and other points of view, but their origin and other considerations are such as to make their unification impossible for the present.

Manchuria will require more railways as it progresses. A glance at the map will show what its future requirements will be in railways and ports of shipment. The double lines on the map show railways of importance which should be built in future and some of them are already under way. These prospective lines are given below :

The Four Principal Leaders of the Manchukuo Government. Upper Left, Tsang Shih-i, Home Minister; Upper Right, Hsi Hsia, Finance Minister; Lower Left, Chao Hsin-po, President of Legislature; Lower Right, Cheng Hsiao-hsu, Premier.

		Miles
a.	Tungliao-Kailu (Gasa)—Linsi lines	222
b.	Kailu-Chihfeng-Jehol lines	389
c.	Chihfeng-Chinchow (notorious town which has come to public notice of late) on Mukden-Shanhaikwan line *via* Changyang	193
d.	Extension of Chinfu Railway *via* Antung and up the river Yalu to Tunghwa and to Hailung on Kirin line	390
e.	Mukden-Tunghwa *via* Fushun on to the Korean border to join a Korean line on the Yalu river ...	300
f.	Changchun to Taonan *via* Talai	213
g.	Huaiyuanchen-Solun-Hailar across the Hsingan Range	360
h.	Kirin-Imienpo-Fangcheng to Sanhsing on the Mutan river	270
i.	Tunhua to Korean border (Kainei) *via* Yenchi ...	120
j.	Yenchi-Hailin-Sanhsing on the Mutan river ...	300
k.	Sanhsing northwestward to Hailun...	200
l.	Hailun northeastward to Wuyun on the Amur river...	250
m.	Hailun-Koshan-Taian	150
n.	Ningnien-Morken-Heiho	250
	Total	3,607

The projected lines mentioned above are not of a haphazard nature but summarize those proposed by authorities who have studied the problem. These lines are not sufficient, especially for the northern sector of Hei-Lung-Kiang Province, which should be provided for as population and farming progress, as they are bound to in the not-distant future.

As ports of shipment for these main lines, there are at present three ports with modern facilities and four others which require new construction and improvements. The two lines running southeastward to the Japan Sea terminate at (1) Vladivostok and (2) the Korean ports of Yuki, Rashin and Seishin near the river Tumen, while those running southwestward to the Gulf of Pechihli and Yellow Sea have as their outlets (3) Antung at the mouth of the Yalu river, (4) Newchwang (Yingkow) at the mouth of the Liao river, (5) Dairen of the South Manchuria Railway, (6) Hulutao, the new harbor now under construction on the Mukden-Shanhaikwan line, and (7) Chinhuangtao, between Shanhaikwan and Tientsin, which is the chief coal shipping port for the Kailan coal mines. When the present operating lines of 3,855 miles are increased by 3,607 miles to be newly built as enumerated above, the present shipping ports of Dairen and Vladivostok will be quite insufficient to handle potential tonnage in and out of Manchuria and Eastern Siberia, which latter can be supplied only from the sea, either the Japan or the Yellow and Pechihli Seas. It goes without saying that harbor facilities and capacities must receive attention simultaneously with new railway construction.

The administration of railways in Manchuria, excepting the S.M.R. and C.E.R. lines, are in the hands of the Transportation Commission of the Four North-Eastern Provinces, with six members, Mr. Ting Chien-shiu being the chairman. How the commission will be able to accomplish its most important work remains to be seen. What it has been doing in the past under Marshals Chang, the father and son in recent years has been very disappointing. Its chief accomplishments seem to have been obstruction and obstacles for railway progress.

The future of Manchuria is exceedingly bright and recent indications show that the people are determined to organize a government free from corruption and stagnation. They even go so far as to plan to form an ideal Utopian state of their own, the only spot on the face of the earth where all will enjoy their life and freedom. We cannot hope to see this realized for a long, long time but we cannot help admiring their courage and conviction. We all should have our ideals.

Railway building and equipment for some 3,600 miles should require Y.700,000,000 at least. Harbor construction for ports in Manchuria and Korea with necessary loading and discharging

(Continued on page 291)

Reconnaissance Survey of a Railway Line from Chungking to Kuangchouwan

By V. K. TING and S. Y. TSENG

Introduction

SZECHUAN is one of the richest provinces in China. Its population has been variously estimated at 45-70 million and its trade amounts to 85 million Haikuan taels. At present, however, it is very poorly equipped with modern means of communications. The navigation on the Yantze Gorges, the only waterway connecting Chungking (Chungching) with Hankow, is so difficult that steamers from Ichang to Chungking with a cargo capacity of 200 tons have to be equipped with 2,000 horse-power engines, and accidents are unusually frequent, hence the extraordinarily high freight rates—a ton of goods from Shanghai to Chungking costs usually more than Tls. 30, and at times may be as much as Tls. 80! To develop Szechuan therefore a railway is absolutely necessary. The line so far proposed for this purpose is the Chengtu-Hankow railway connecting Chengtu with Hankow *via* Chungking, but this line has very serious engineering difficulties, and at best runs parallel to the existing water route. Even if it is built, Chungking will not be in direct communication with a true sea port for Hankow is still 950 kms. from the coast.

In 1928 when travelling in Kuangsi, V. K. Ting was struck by the favorable conditions for railway building along certain routes. For example a line 560 kms. in length running from the sea port of Kuangchouwan to Hoch'ih in N.W. Kuangsi can be built without encountering any obstacle. The distance between Hoch'ih and Chungking is about the same as that between the latter and Hankow; therefore if an easier route than that of Chungking-Hankow could be found through the province of Kueichou which lies between Chungking and Hoch'ih, it would be a more natural outlet for Szechuan than the proposed Chengtu-Hankow railway, since Kuangchouwan is only some 1,400 kms. from Chungking whilst the distance Shanghai-Chungking is about 1,900 kms.

With this object in view a reconnaissance survey was carried out from Chungking to Huilo, a point south of Nantan district in Kuangsi, when V. K. Ting went to Kueichou in 1929-1930 in charge of a geological expedition organized under the joint auspices of the Ministry of Railways and the Geological Survey. S. Y. Tseng acted as topographer to the expedition, but the geologists Messrs. T. K. Huang and Y. L. Wang also took part in making some of the route maps.

Topographical Data

It was at first intended to carry out a plane-table survey along the proposed route, covering as much area on both sides as possible rather than trying to locate a definite line. But the weather during the trip was so foggy, often with drizzling rain, that the method was found to be impracticable. The route-maps were therefore made by pacing, Brunton compass, and aneroid, but the traverse was always plotted in the field onto a sketching board which was also used as a small plane-table for sketching the topography nearby; a number of heights off the route were roughly determined by using a levelling mirror, serving as bases for sketching in the contours.

In the course of the expedition the following 28 determinations of longitude and latitude were made:—

Locality	*N. Latitude*	*E. Longitude*
Chungking ...	29°-33′-31″	106°-34′-40″
Ch'ichiang ...	29°-01′-55″	106°-38′-39″
Tungch'i ...	28°-46′-10″	106°-38′-47″
T'ungtze ...	28°-08′-28″	106°-49′-21″
Pauch'iao ...	27°-58′-34″	106°-54′-43″
Tach'iao ...	27°-50′-24″	106°-52′-04″
Tsuni	—	106°-55′-24″
Shihtzup'u ...	27°-45′-30″	—
Yanglungchai ...	27°-16′-10″	106°-45′-51″
Sifung	27°-06′-06″	106°-44′-06″
Kuciyang ...	26°-35′-35″	106°-41′-59″
Tushan ...	25°-50′-10″	107°-32′-20″
Nanchai... ...	25°-19′-33″	107°-25′-52″
Nantan	24°-58′-13″	107°-32′-54″
Huilo	24°-53′-17″	107°-38′-04″
Shihhao ...	28°-32′-38″	106°-40′-55″
Liyuanpa ...	28°-29′-28″	106°-38′-08″
Chiensi	27°-02′-03″	106°-01′-34″
Sich'i	27°-03′-30″	105°-48′-30″
Tating	27°-08′-43″	105°-36′-15″
Chensiwei ...	26°-45′-56″	106°-19′-58″
Suiyang ...	27°-57′-25″	107°-11′-06″
Meitan	—	107°-25′-35″
Meitan	27°-46′-04″	—
Tuch'iao ...	26°-15′-11″	106°-40′-44″
Shuiyen ...	25°-46′-24″	—
Fangts'un ...	25°-32′-19″	107°-46′-22″
Lipo	25°-24′-52″	107°-53′-28″

The latitudes were determined by observing the circum-meridian altitude of stars, and the longitudes by single altitude of east and west stars. We had with us a 7-in. Breithaupt transit, two chronometer watches, and a wireless set for picking up time signals. It is believed that the latitudes are accurate to about 10 seconds and the longitudes to 30 seconds of arc.

We are indebted to Pères Henri Fayet and Sylvian Bras of the French Catholic Mission at Kuciyang for the following astronomical determinations made by a member of the Mission:

Locality	*N. Latitude*	*E. Longitude*
Loahuangp'ing	26°-59′-46″	107°-45′-12″
Kuciyang (Peit'ang) ...	26°-35′-38″	
Liuch'ungkuan	26°-38′-16″	
Shihch'ien	27°-31′-29″	
Szunan	27°-55′-43″	
Maotien (100 *li* N. of Wuch'uan)	28°-44′-48″	
Maoliao	28°-48′-46″	
Tzuchiang	27°-01′-55″	
Tuanp'u (Pingyuch) ...	26°-47′-53″	

Pères Fayet and Bras further supplied us with the following elevations determined with a mercury barometer:

Locality	*Elevation*	*Locality*	*Elevation*
Kuciyang(Peit'ang)	1,095 m.	Chenning ...	... 1,297 m.
Ts'ingchen ...	1,245	Licha ...	... 1,300
Tsuni	830	Puting ...	... 1,238
Anp'ing	1,287	Tingfan ...	... 995
Lungli	1,110	Ch'iensi ...	... 1,268
Anshun	1,389	Ts'ingyen ...	... 1,095
Suiyang	850	Tushan ...	... 997
Chianglung ...	1,171	P'ingfa ...	... 1,093
T'ungtzu	927		

With these data the route-maps were corrected and adjusted. They will eventually be published as geological maps in the geological report. Here we give only in Plate III a profile from Chungking to Tat'ang in Kuangsi, the part from Huilo to Tat'ang being based on the topographical data collected by V. K. Ting in 1928 and that between Kueiyang and Tushan, and between Chungking and Ch'ichiang, on the reconnaissance by Mr. Yew C. Lee of the Ministry of Railways who went over that route soon after us. In addition the proposed line is shown in red on the 1:1,500,000 maps in Plates I and II which have been compiled from all available data including our own reconnaissance.

PLATE 1
川廣鐵道綫勘測初步計劃附近及礦產圖
PLAN SHOWING THE PROPOSED SZECHUAN-KUANGCHOUWAN RAILWAY
AND THE MINERAL RESOURCES IN ITS VICINITY
一之萬十五百一尺例比
Scale 1:1,500,000
LEGEND 例圖
Proposed Szechuan-Kuangchouwan Railway (Reconnoitered) 線路道鐵廣川之勘初經已
(Possible Alternative) 線路道鐵廣川之勘測擬分
× Coal 煤
♂ Iron 鐵
♁ Antimony 銻
Sn Tin 錫
☿ Mercury 銀水
☽ Silver 銀
Mn Manganese 錳
Bi Bismuth 鉍
W Wolfram 鎢
M Molybdenum 鉬

Plate 1

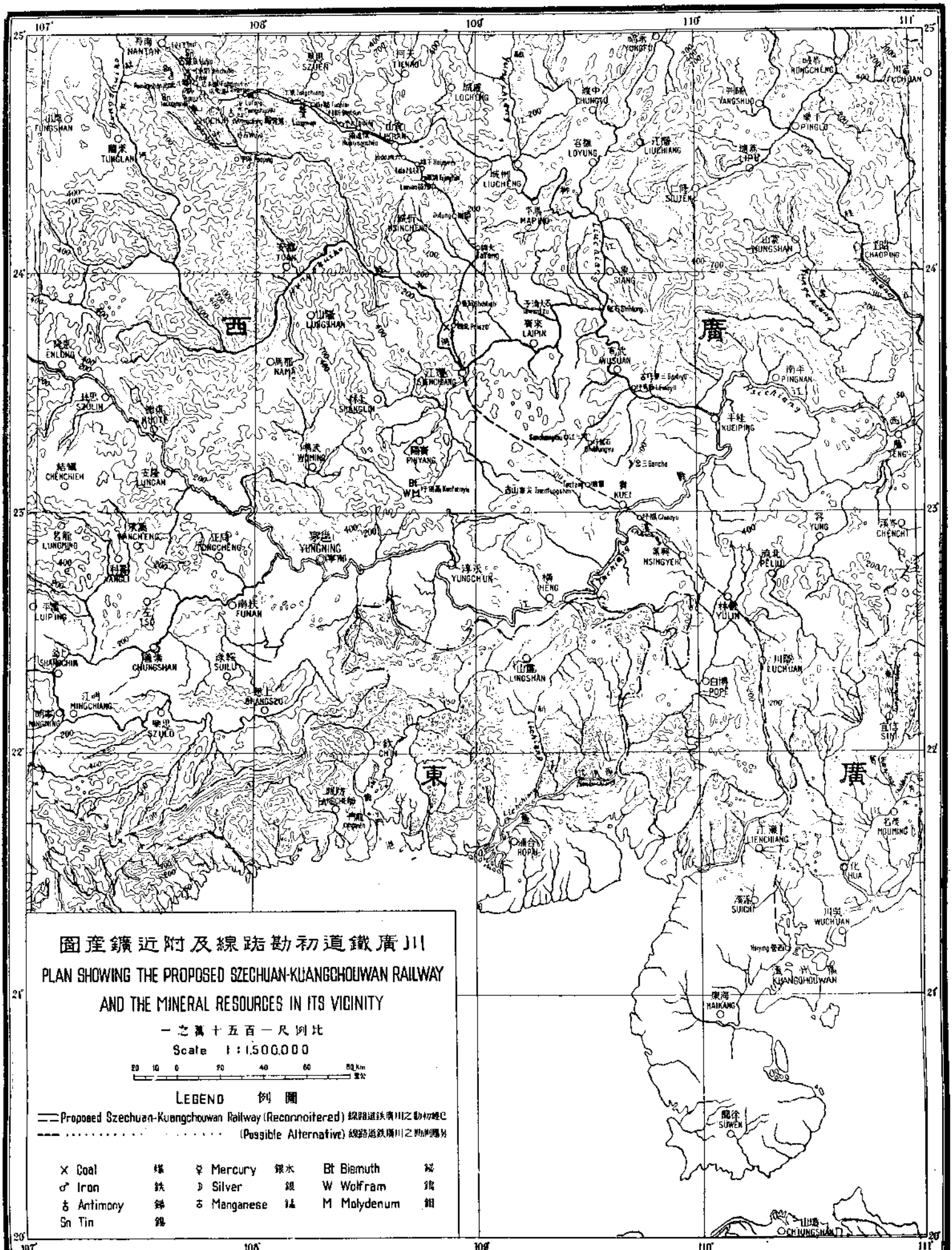

圖二第
PLATE II
圖產鑛近附及線路勘初道鐵廣川
PLAN SHOWING THE PROPOSED SZECHUAN-KUANGCHOUWAN RAILWAY
AND THE MINERAL RESOURCES IN ITS VICINITY
一之萬十五百一尺例比
Scale 1:1,500,000
LEGEND 例圖
Proposed Szechuan-Kuangchouwan Railway (Reconnoitered) 線路道鉄廣川之勘初經已
(Possible Alternative) 線路道鉄廣川之勘測擬另
× Coal 煤
♂ Iron 鉄
♁ Antimony 鉾
Sn Tin 錫
☿ Mercury 銀水
☽ Silver 銀
♁ Manganese 錳
Bt Bismuth 鉍
W Wolfram 鎢
M Molydenum 鉬
西
廣
東
廣
NANTAN
TIENAO
LOCHENG
CHUNGYU
YANGSHUO
PINGLO
LIUCHIANG
LIUCHENG
SIUJEN
MAPING
SIANG
LAIPIN
WUSUAN
PINGNAN
KUEIPING
CHENCHI
KUEI
YUNGCHUN
HSINGYEH
PEILIU
YULIN
LUCHUAN
POPE
LIENCHIANG
MOUMING
HUA
SUIGHI
WUCHUAN
KUANGCHOUWAN
HAIKANG
SUWEN
CHUNGSHAN
LUNGSHAN
NAPA
SHANGLOH
WUMING
PINYANG
LUNGCHANG
CHENCHIEH
LUNGAN
LUNGPING
YUNGNING
FUNAN
SUILU
SHANGSZU
SZULO
MINGCHIANG
HOPU
TUNGLAN
SZUEN
TUAN
ENLONG
SZOLIN
MIAOTE
YANGSI
LUIPING
TSO
SHANGCHIN
CHAOPING
SIN
YUNG
CHENCHI

Plate 2

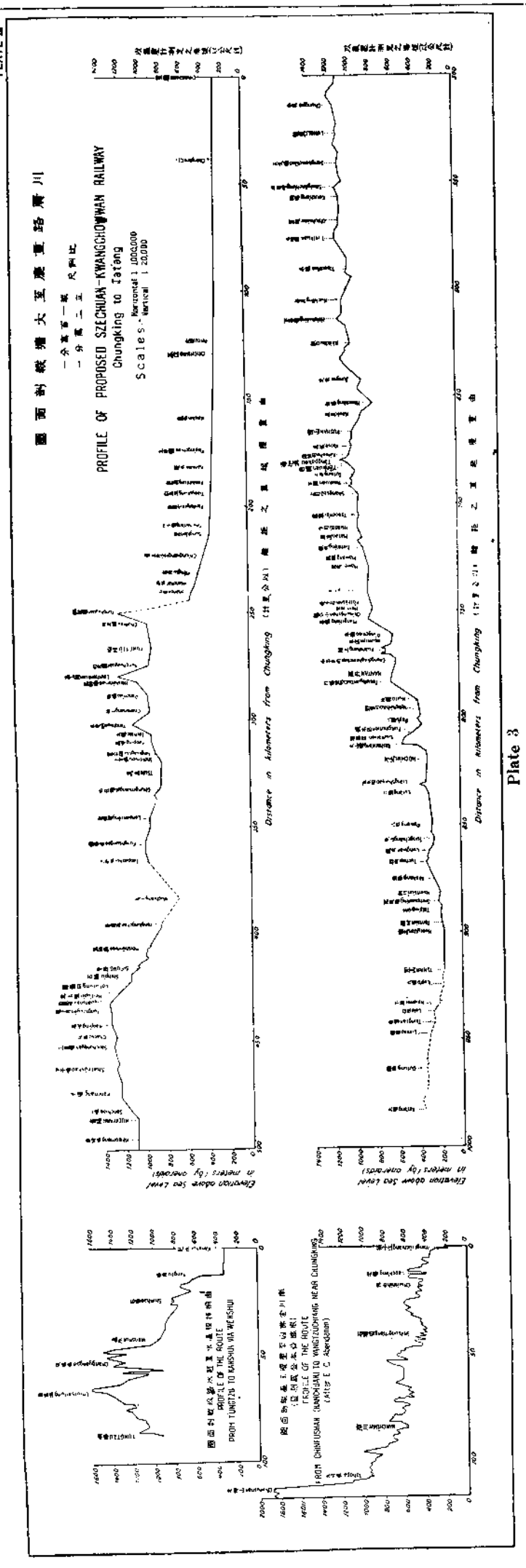

PROFILE OF PROPOSED SZECHUAN-KWANGCHOUWAN RAILWAY
Chungking to Tatang
Scales: Horizontal 1:200,000
Vertical 1:20,000
Distance in kilometers from Chungking
Elevation above Sea Level in meters (by aneroids)
PROFILE OF THE ROUTE FROM TUNGTZE TO KANSHUI VIA WENSHUI
FROM CHINFUSHAN (NANCHUAN) TO WANGTZUCHANG NEAR CHUNGKING
(After E. C. Abendanon)

Plate 3

Proposed Line

The whole line, 1,411 kilometers long, may be divided into several sections:

From Chungking to Kanshui—181.5 kms.—The caravan route lies across the hills and is quite unsuitable for a railway. By following the Yangtze up river to Chiangk'ou, and then the Ch'ichiangho to Kanshui, the grade should be sufficiently low, although considerable rock cutting will be necessary as the Ch'ichiangho is a shallow gorge cut in the red sandstone and shale which are, however, rather soft.

From Kanshui to Tsuni—142 kms.—This is by far the most difficult section of the whole line. From Kanshui south to Sungk'an, the line must follow the Sungk'anho which forms a very narrow gorge. In three places the gorge is in massive limestone, which forms vertical walls, to go through which will need very long tunnels. Another limestone gorge lies between Sungk'an and Mengtu. From Hsinchan to Ch'umpip'u, the only possible line is by the pass of T'ungkuyuan which forms the worst gradient of the whole line even if a long tunnel is made. The relative elevation of T'ungkuyuan and Hsinchan as shown in the profile is, however, not very reliable as we did not make any direct comparison, nor did we survey the valley between. From T'ungtze to Tsuni two long tunnels will be necessary. Otherwise the country is easy.

From Tsuni to Kueiyang—162.5 kms.—This section is quite easy except for the crossing of the Wuchiang which will need considerable detailed study before a line can be located. Probably it will be more economical to follow the branch valley from Tsuni S.E. to the Wuchiang instead of *via* Taopashui.

From Kuiyang to Tuchan—180 kms.—We traversed only the part from Kueiyang to Lungsung. From the latter to Tushan it was studied by Mr. Yew C. Lee. According to his data the section is moderately difficult.

From Tushan to Hoch'ih—153.5 kms.—The 87.5 kms. between Tushan and Mangch'ang are quite easy, but from the last named place to the city of Hoch'ih great difficulties have to be overcome. The descent from Mangch'ang to Hsintien is fairly abrupt, and to reach Nantan from Hsingtien, a long tunnel will be necessary to get over the pass of Kuanshang. Between Nantan and Hoch'ih lie two serious obstacles: the steep descent from Tasip'o to Huilo, and the high pass of Tashant'ang between Pap'u and Hoch'ih. The latter can perhaps be avoided by following the stream from Yehch'ehho down to a point east of Hoch'ih.

From Hoch'ih to Ch'ienchiang—227.5 kms.—This section is quite easy apart from a short tunnel at Liangshuiao and the two bridges: one over Tungchiang, and the other the Hungshuiho, for, although considerable cutting will have to be done, most of it lies in soft red clay, not unlike the loess of North China.

From Chienchiang to Kuangchouwan—364 kms.—We have no personal knowledge of this section, but it was studied by the engineers of the proposed Chuch'in railway in their reconnaissance. No detailed maps have come to our notice, but from the preliminary estimates made by the same engineers, it is certain that this is the easiest section of the whole line.

In this connection we may mention that the route chosen by these engineers is the only possible one, for Kuangchouwan is the only good harbor on this part of the coast. The often proposed Ch'inchou harbor is quite impossible, and the route *via* K'ueihsien is the only easy line to the sea.

Possible Alternatives

From the above summary it is clear that the most difficult sections are two in number: namely, between Chungking and Tsuni, and between Tushan and Hoch'ih. If the line must pass through the cities of Chungking, Tsuni and Tushan, it is practically certain that the line described will not only be the shortest, but also the only possible one. We were told by the local people at Tsuni that two other routes were possible. The one *via* T'ungtzu and Wenshui to Kanshui; the other *via* Chengan and Nanch'uan. S. Y. Tseng went over the first country together with T. K. Huang. The result of their journey is shown is a profile in Plate III. The Nanch'uan route was not studied, but Abondanon made a journey from Chungking to Nanch'uan many years ago, and his section is here reproduced in Plate III. Neither route will be practicable for a railway. No better line west of Chungking is likely to be discovered, for the further we go westward from Chungking, the higher is the country to the south.

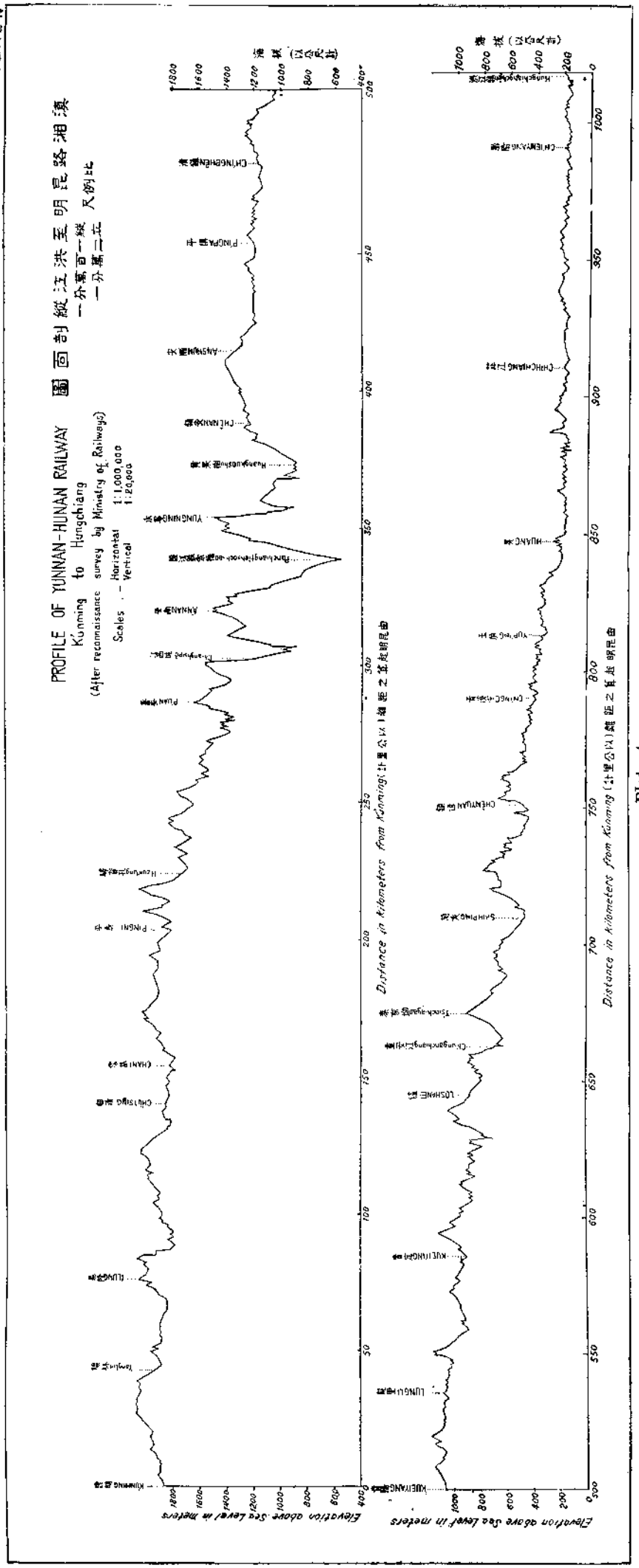

PROFILE OF YUNNAN-HUNAN RAILWAY
Kunming to Hungchiang
(After reconnaissance survey by Ministry of Railways)
Scales. — Horizontal 1:1,000,000
Vertical 1:20,000
Distance in kilometers from Kunming
Elevation above Sea Level in meters
Distance in Kilometers from Kunming
Elevation above Sea Level in meters

Plate 4

From Tushan the only other route to Kuangsi is *via* Lip'o. We traversed the section between the last named city and Tushan and found that it was quite impossible. From the nature of the topography it is improbable that an easier route can be found between Tushan and Nantan, although it may be possible to avoid the formidable pass of Tashant'ang by following the Yehch'ehho as mentioned above.

If, on the other hand, we merely want to find the easiest line between the upper Yangtze and Kuangchouwan without being conditioned by the necessity of passing through the most populous cities in this part of the country, then the following routes deserve careful study. A glance at the map in Plate I shows that the only tributary of any length, that comes from Kuichou northward to join the Yangtze, is the Wuchiang, known as Ch'ienchiang above the city of Fouling, 103 kms. below Chungking. By following the valley of the Wuchiang *via* Szunan as far as Ch'ingshuichiang and turning southward, we can reach either Kueiyang, or Chiuhsien, 101 kms. N.W. of Tushan. The practicability of this route depends on the nature of the valley of the Wuchiang. The distances between the various points mentioned are roughly as follows:

Fouling	0 kms.
Szunan	328 ,,
Ch'ingshuichiang	502 ,,
Kueiyang	627 ,,

If, instead of going to Kueiyang, the line goes south to Chiuhsien, the distance will be only a few kilometers shorter, but the distance between Fouling and Tushan will be 720 kms. instead of 807 kms. *via* Kueiyang. In either case the 103 kms. between Fouling and Chungking will have to be added if the latter is still our turminus. Thus:—

Chungking to Kuangchouwan *via* Tsuni and Kueiyang—1,411 kms.

Chungking to Kuangchouwan *via* Fouling and Kueiyang—1,655 kms.

Chungking to Kuangchouwan *via* Fouling without passing Kueiyang—1,569 kms.

If the Tushan-Hoch'ih section is proved to be too difficult, it may be also avoided altogether by going from Kueiyang directly south *via* the cities of Tingfan and Loho and thence following the valley of Hungchuiho to Ch'ienchiang. It is, however, rather doubtful if it will be easier, and it has the disadvantage of passing through very sparsely inhabited country.

Probable Cost

As we did not locate a line in the engineering sense of the term, it is of course impossible to estimate the real cost. But if we assume that no better line can be found and that the ruling grade of the proposed line is to be 2%, it is possible to have some idea of the order of magnitude of the probable cost. For this purpose we divide the line into five classes according to their relative engineering difficulty, and assume a cost per unit kilometer for each class. This unit cost includes earth works, small bridges and culverts. The result is summarized in the following table:

Class	*Unit cost in silver dollars.*	*Kilometers*	*Cost of the class*
A	$ 45,000	557	$25,065,000
B	$ 60,000	334	$20,040,000
C	$ 80,000	309	$24,720,000
D	$120,000	171	$20,520,000
E (Tunnels)	$ 1,000 per meter	40	$40,000,000
Total			$130,345,000

To this we have to add:—	
Five large bridges 3,000 m. long at $1,500 per meter	$4,500,000
Ballast at $2,500 per kilometer (1,411 kms.)...	$3,527,500
The total of the above items ...	$138,372,500

The material (excluding bridges) which has to be purchased from abroad is estimated in gold dollars as follows :—

1.	Sleepers at G.$1,200 per kilometer	G.$1,693,200
2.	Rails at G.$4,200 per kilometer	G.$5,926,200
3.	100 Locomotives at G.$40,000	G.$4,000,000
4.	1,000 40-ton freight cars at G.$2,000 ...	G.$2,000,000
5.	210 Passenger cars at G.$8,000 (average for 3 classes)	G.$1,680,000
	Total	G.$15,299,400

At the present rate of exchange the items in gold dollars would amount to about $60,000,000 silver, so the total cost of the proposed line would be about $200,000,000 silver. It is believed that this figure represents the right order of magnitude.

Economic Prospects

The economic prospect of any railway depends ultimately upon the density of the population and the resources of the region through which the line has to pass. We will discuss these questions very briefly in the following:

Mineral Resourses

1.—Coal.—In the province of Kuangsi and the S.W. part of Kuangtung there is no workable coalfield anywhere within economic distance of the proposed railway, with the doubtful exception of the one near Kueihsien. According to Mr. T. O. Chu* the Sanchiangk'ou coalfield contains one seam of 1.5 m. thick on the average. The total reserve may reach 50,000,000 tons, but the analysis of a random sample gives 57.38% of ash. If the sample is a representative one and the analysis reliable, the coal is too poor in quality to be workable.

In Kueichou, although coal is very widely distributed, very few fields can be worked on a large scale. We need only consider two of them. The more important one occurs about 12 kms. west of Kueiyang. Only one seam reaches the thickness of 1 m. The total possible reserve can not be more than 22,000,000 tons. The coal is, however, of excellent quality. The ash content varies between 4.9-20.9%, and volatile matter 11-16%. The coalfield is continued northward, but the main seam becomes less than 1 m. in thickness.

The other field is about 25 kms. N. of Anshun. According to Mr. S. S. Yoh† there are four seams one of which reaches the thickness of 1.2 m. The reserve may reach 10,000,000 tons. No analysis has been made, but the coal is bituminous.

In Szechuan the only field of importance near Chungking is the Sishan coalfield on the Chialing river about 60 kms. N. of Chungking. It is being actively mined and the native mines are connected to the river by a narrow-gauge railway. Of the seven seams six are below 1 m. but the lowest seam has the thickness of 3 m. The probable reserve is about 10,000,000 tons. The coal is semi-bituminous and of fairly good quality.

Good coking coal is known to occur near Wanshouch'ang east of Ch'ichiang in the district of Nanch'uan, but no study has been made.

2.—Metalliferous Deposits.—In Szechuan the only metalliferous deposit near the proposed line is the iron deposit at T'ut'ai, 6 kms. W. of Kanshui. Unfortunately Y. L. Wang, who went to study the deposit, was prevented from so doing by brigands. The ore is a haematite of good quality, occurring as a bedded deposit in the Jurassic sandstone. The native mines produce about 1,000 tons of pig-iron in the best years. Its future development depends not only on the size of the deposit, but also on the workability of the coking coal field of Wanshouch'ang as mentioned above.

In Kueichou the only metalliferous deposit that has been worked is that of mercury and cinnabar, which occur widely in the east and north-east of the province, but the veins are very small and scattered and it is doubtful if they can ever be worked on a large scale.

In Kuangsi, however, metalliferous deposits are more numerous. The silver-copper deposit at Sanchia Kueihsien district, the wolfram and bismuth at Kaot'ien, Pingyang district, the antimony of Ts'ienfungshan, Pingyang, and the manganese of Sanlihsu, Wuhsuan district, are all of value, but they are all situated not far from navigable rivers and will hardly ever affect railway traffic (see Plate II).

Of greater interest from the point of view of the proposed railway are the tin deposits of Hoch'ih and Nantan. Tin occurs over a fairly large area, mainly between the district cities of Hoch'ih and Nantan. It is partly true lodes, partly residual clay, and, to a much less extent, also alluvium. V. K. Ting studied these deposits in 1928 in some detail. It is estimated that altogether there are some 10,000 tons of tin. In the past the highest production reached was about 200 tons per annum. It can no doubt be greatly increased if the proposed line is built.

Water Power.—In a region where fuel is so scarce, it is obvious that water power would be of very great importance. The only waterfall of any interest is that of Huangkoshu near Anshun. But although the fall is over 70 m. high the flow per second is less than 20 m^3, so the amount of power is limited. Far more hopeful are some of the rivers. In addition to the West River the proposed line crosses three large rivers, the Wuchiang, the Liuchiang known as Tungchiang above Ishan, and the Hungshuiho, the longest head water of the Chuchiang, or Pearl River. At the point where the proposed line is to cross all three are not navigable, but encased in narrow gorges not much more than 100 m. in width with steep limestone walls 100-200 m. high. In these gorges villages are few and far between. It will be easy to dam these up and obtain a considerable fall for generating power. No surveys have been attempted, but by making some probable assumptions about the quantity of flow per second, we estimate that the three rivers together can generate some 350,000 horse-power.

It will be seen from the above considerations that the mineral resources are essentially limited, and whilst water power is large, its development will be expensive. Moreover both Kuangsi and Kueichou are poor in agricultural resources and thinly populated. The cities and villages through which the proposed railway is to pass do not contain more than 1,000 people including both Kuangchouwan and Chungking. Whilst much of the hill land, which is at present wasted, can be utilized if a railway is built, the utilization will be a slow process, and no appreciable return can be expected in the near future. Nevertheless it is our considered opinion that the proposed railway will pay, and, for reasons other than economic, its building is an absolute necessity.

Firstly, the proposed railway will serve as an effective outlet to the sea for one of the largest and richest provinces of China. Szechuan has a population variously estimated at 45-70 million. Even if we take the smaller figure, its present trade per capita with the outside world is ridiculously small. Owing to natural obstacles freight rates on the upper Yangtze will always remain high. For the last few years the total trade passing through Chungking and Wanhsien amounts to about 170,000 to 200,000 tons, or one ton per 250 persons! Before 1910 when steamers began to go through the Gorges, the total trade was less than 70,000 tons. It has increased three times since. But even now only valuable cargo can be shipped since the freight of a ton of goods from Shanghai can not cost less than Tls. 30 per ton. If the proposed line is built, it will bring Chungking within 1,411 kms. of the sea by rail. According to freight rates prevalent on the existing railways, the cheapest goods can be shipped from Chungking to Kuangchouwan at $10 per ton. It will be possible, for example, to transport coal from Chungking to Wuchou, Kuangchouwan and even Canton. In a few years Szechuanese trade with the outside will be increased by leaps and bounds. Given time, it will not be difficult for the railway to have an income of $20,000,000 a year which ought to be sufficient to meet all the charges.

Secondly, the proposed railway is the necessary step for the effective abolition of the opium trade. At present most of the opium that passes to the Yangtze and the West river district comes from Kueichou and Yunnan, especially from the former. Now owing to climatic conditions Kueichou cannot produce cotton. It has also to import every year some 30,000 tons of salt from Szechuan. Because of the terribly difficult means of communications, a ton of goods shipped from Kueiyang to Chungking costs $200, to Ishan in Kuangsi $170, and to the nearest waterport of Chenyuan in Kueichou $100. Consequently, nothing can be exported from Kueichou in exchange of the two necessities of life,

* T. O. Chu: A Preliminary Report on the Geology and Mineral Resources of Kwei, Hung, Yung Chun, Yung Hing and Ping Yang districts, Kwangsi Province. Annual Report of Geol. Surv. Kwangtung and Kwangsi, Vol. 1, 1927-1928.

† S. S. Yoh: Geological Reconnaissance of Western Kweichou, Bull. Geol. Surv. China. No. 12.

cotton and salt, except opium. In the old days, regular subsidies from neighboring provinces amounting to several million taels per annum used to be given to Kueichou. Towards the end of the Manchu régime, these were discontinued, and during the years 1910-1916 when opium prohibition was rigorously enforced the people of Kueichou suffered terribly. It is not possible to ask the 7,000,000-10,000,000 people to do without either cotton or salt for any length of time. If the proposed line is built, rice, t'ung oil, and possibly some coal and timber can be exported, and there will no longer be the same necessity for producing the poisonous drug.

Comparison with other Proposed Lines

Finally, let us examine the other lines proposed to be built through the same region and compare their distance, cost and economic prospect with our proposal. The following table summarizes the main data:

Line	*Distance (Kms.)*	*Probable cost*	*Provinces to be traversed*
1. Tat'ung-Ch'engtu ..	1,800	$200,000,000	Shansi, Shensi and Szechuan
2. Hsingyangchou-Ch'engtu	1,100	$200,000,000	Hupeh, Shensi and Szechuan
3. Shashih-Hsingi ..	1,200	$140,000,000	Hupeh, Hunan and Kueichou
4. Ch'inchou-Chungking ..	2,300	$300,000,000	Szechuan, Yunnan, Kueichou, Kuangsi and Kuangtung
5. Canton-K'unming ..	2,100	$300,000,000	Yunnan, Kueichou, Kuangsi and Kuangtung
6. Changsha-K'unming ..	1,500	$250,000,000	Yunnan, Kueichou and Hunan
7. Ch'uchou-Ch'inchou ..	1,100	$130,000,000	Hunan, Kwangsi and Kuangtung
8. Ch'engtu-Hankow ..	1,500	$230,000,000	Hupeh and Szechuan
9. Chungking-Kuangchouwan ..	1,411	$200,000,000	Szechuan, Kueichou, Kuangsi and Kuangtung

The cost is arrived at by adding 2/5 to old estimates when such are available (such as the Chuchou-Ch'inchow, and the Ch'engtu-Hankow). When no previous estimates exist, it is estimated according to the distance and the general nature of the country.

Of the eight proposed railways other than our own, 1-4 have loan agreements with foreign interests, but no surveys have been made. Five and six are new railways proposed by the Ministry of Railways in 1929 and reconnaissance surveys have been carried out. Seven and eight have also foreign loan interests and have been carefully surveyed. We can dismiss at once one, two, three and six, for they are not only all very difficult engineering projects, but also they all end in inland cities, between which no active trade can be expected. How difficult these lines are may be easily grasped from Plate IV where we reproduce a profile of the Yunnan-Hunan (K'unming-Changsha) railway as an example. The lines four and five have similar objects in view and in part overlap with one another, for the Ch'inchou-Chungking railway was expected to pass through K'unming *via* Suifu, and continue through S.W. Kueichou and N.W. Kuangsi to the sea port of Ch'inchou in S.W. Kuangtung, whilst the Canton-K'unming railway coincides with the former from K'unming on as far as Ch'ienchiang whence it continues to Canton along the West River. The former is the longest of these lines as well as the most difficult. It would make the distance from Chungking to the sea unnecessarily long, namely 2,300 kms. instead of 1,411 kms. The Canton-K'unming line is neither long nor so difficult, but Yunnan, Kueichou and Kuangsi are all poor provinces, very thinly populated therefore there is no prospect of any profitable return as the French controlled Yunnan-Tonkin railway amply proves. The Chuchou-Ch'inchou and the Ch'engtu-Hankow line are the only ones we need take into serious consideration.

A glance at the map, however, will enable us to realize that the Chuchou-Ch'inchou railway runs partly parallel to the Canton-Hankow line, and its lower course, from Tat'ang to Kuangchouwan coincides with our proposed Chungking-Kuangchouwan line. Originally it has nothing to do with Szechuan. We can well build the lower section first and make it a part of a N-S trunk line in S.W. China instead of being a branch of the Canton-Hankow as it was originally intended.

The Ch'engtu-Hankow line cannot be dismissed so easily. Of all the railways enumerated this is the best studied. But in comparing it with our proposal as a rival outlet for Szechuan, it has the following disadvantages: firstly, it runs parallel to an existing water way; secondly, it gives Chungking only an indirect outlet to the sea *via* Hankow, the distance Chungking-Shanghai being 2,500 kms. instead of 1,411 as in our project; thirdly, it does not provide Kueichou and Kuangsi (and eventually Yunnan by means of a branch line) with the badly needed modern means of communications in order to make opium suppression possible; for if a railway is to be built at all through such poor provinces like Kueichou and Kuangsi, it must end in a rich and thickly-populated province like Szechuan, otherwise the line will never be paying. On the other hand, the proposed Chungking-Kuangchouwan line serves our purpose far better, for it provides Szechuan with the shortest possible outlet to the sea at the same time saves Kueichou and Kuangsi from permanent dependence on opium; it is not more expensive than the Ch'engtu-Hankow line, but does not run parallel much with any existing modern means of communication. It is our belief that, if S.W. China is to have a railway at all, this will be the first—and, for a long time to come, the only possible one.

Balatoc Mine Richest in World, is Claimed

That the richest gold mine on earth, in point of gold value per ton of ore, is located in Benguet, Philippine Islands, is the statement of Mr. J. D. Highsmith, well-known mining man of Baguio. He referred to the Balatoc mine. Mr. Highsmith is noted among Baguio mining men for his conservatism.

"This statement, startling as it may appear," stated Mr. Highsmith, "is borne out by the statistics published not long ago by the *Engineering and Mining Journal*, the world's foremost authority on mining matters, covering the output of eleven of the world's leading gold mines for the year 1928.

"Balatoc did not begin to produce until 1929," continued Mr. Highsmith, "but the records of 1928 showed that the Ashanti mine, on the Rand, South Africa, was in that year the best producer in point of gold per ton of ore milled. Its record was one and twenty-two hundredths (1.22) ounces per ton. The value of gold bullion is, roughly, twenty dollars per ounce, so that the per ton value of the Ashanti ore, in dollars, was twenty-four dollars and forty cents.

"In 1929 the ore milled at Balatoc averaged in value twenty-nine dollars per ton. That is a matter of record that will not be disputed by anyone knowing the facts.

"There are many gold mines whose yearly production of gold bullion is several times the quantity produced by Balatoc. That is because of the much larger daily output of ore in those mines. The daily capacity of the Balatoc mill has never been more than one hundred and seventy tons of ore. With the new additions to the mill now almost ready for service, the capacity will reach three hundred and fifty tons of ore daily, that is, more than double the present capacity. But the per ton cost of production and treatment of this extra one hundred and eighty tons daily will be at least thirty-five per cent less than the present production cost, due of course to the mine will be tripled.—*Manila Bulletin.*

Chinese Railway Contracts for Sheffield

The railway steel departments of the principal Sheffield steelworks, which have been suffering from slackness for a considerable time, are looking forward more hopefully as a result of the decision of the Government with regard to the allocation of the Boxer indemnity. Under this arrangement it is provided that during the next two or three years the sum of £3,500,000 shall be spent in the United Kingdom on equipment for the railways of China. It is approximately eight years since any orders of importance were received in England from the Chinese railways, although a good deal of work has gone to Belgium. It is regarded as certain that a substantial amount of work for axles, tires, and springs, and steel parts of engines, will now be placed in Sheffield. In the meantime, Sheffield plants are still poorly employed, due to the economies that are being forced upon the British railway companies as a result of adverse trading results.

Steel research, it is interesting to note, continues to be an important consideration of the Sheffield industry. The department for the cold-working of steel and other ferrous metals, which has now been in operation at Sheffield University for a year, is engaged on some very interesting researches. The matters selected for study include the drawing of wire of about 0.65 per cent carbon, the rolling of dead mild steel of the class used for deep drawing, and the drawing of mild steel rods about one inch in diameter. Special attention has been given to the resistance to fatigue of steel drawn under different conditions, and to the variation of hardness in drawing. Instruments have been devised and constructed for measuring the actual pressures during drawing and rolling, and work is now in hand to determine the amount of energy stored in the metal during processes of cold-working.

introduction of local air-lines in the Ukraine, the Urals and the Northern Caucasus for the purpose of linking up local centers. The total length of these lines it is estimated will amount to about 5,000 km. which, bringing the total length of air-lines to 55,000 km., will place the Soviet Union *second in the world* in their length of air-lines. (It is interesting to note that this development is in excess of the estimate of the Five-Year Plan).

It is anticipated that during the current year there will be a total length of 13.5 million km. flown, 45.5 thousand passengers carried, and 2,300 thousand kg. of mails and goods.

Another item in the programme now in hand is the reorganization of the principal air-routes of the Trans-Soviet (Moscow-Zakavkasie, Moscow-Central Asia, Moscow-Far East). It is proposed to institute day and night services which will work according to a carefully planned schedule to obviate unnecessary delays where change of line occurs, and generally to speed up the services so that the journey from Moscow to Tiflis, and Moscow to Tashkent can be completed within twenty-four hours, and the journey from Moscow to Irkutsk within forty hours. With this aim in view there will be considerable improvement in the equipment of aerodromes, light signals and radio accessories will be introduced and existing air-engine depôts enlarged to facilitate service.

Since the inception of the civil aviation industry in the U.S.S.R., considerable achievements have been made in the construction and design of airplanes.

In 1926 Soviet designers created two types of single-engine airplanes for civil aviation: Mailplane "ANT 3" (designed by Engineer Tupolev) and a passenger plane "K 4" (designed by Engineer Kalinin). The "ANT 3" plane made two flights of world importance in 1926, following the route Moscow-Koningsberg-Berlin-Paris-Rome-Vienna-Prague-Warsaw-Moscow in 34 hours (distance of 7,000 km.), and in 1927 the route Moscow-Tokyo-Moscow (22,000 km.). The passenger plane "K 4" made the interesting flight from Kharkov-Moscow-Novosibirsk-Irkutsk, covering a distance of 10,500 km.

The next successful step of Soviet airplane construction was the two-engine airplane "Land of Soviets" on which the difficult flight from Moscow to New York over the Pacific Ocean was accomplished in 1929 (20,580 km.) in 138 hours.

In 1929 Engineer Kalinin designed a more powerful one-engine airplane "K 5" estimated to carry eight passengers. In the same year a number of new constructions in light planes were achieved.

In 1929 Soviet aviation introduced another important airplane "ANT 9" ("Wings of Soviets") designed by Engineer Tupolev. This plane made the wonderful flight from Moscow-Berlin-Paris-Rome-London-Berlin-Warsaw-Moscow—a distance of 9,000 km. in 53 hours.

The development of airplane construction proceeds and new and improved civil machines of high capacity are being built.

One of the most important achievements is the airplane "ANT 14" (designed by Engineer Tupolev), built in 1931. "ANT 14" is a monoplane with a free-carried wing, fitted with five motors of a total capacity of 2,400 h.p. The airplane is designed to carry 41 passengers and is equipped according to the latest demands of engineering (it contains comfortable passengers' compartments, dressing-rooms, lavatories, luggage room, a lobby, a restaurant, ventilation, electric equipment for night flights, etc.) "ANT 14" is one of the world's largest planes.

There is another aspect of civil aviation in the U.S.S.R., and that is the part played by it in connection with the People's Economy. Photographs taken from the air are of great assistance in the preparation of maps and plans, the work of the Forestry, Agricultural Constructional and Surveying Departments. In 1931 the U.S.S.R. were second after the U.S.A. in aero-photographic works.

The following table shows the increased use of airplanes in this manner:—

Years	*Area photographed (in km.)*
1925	930
1926	5,620
1927	16,390
1928	30,722
1929	34,300
1930	95,339
1931 ... ... (as per plan).	250,000

An important part played by aviation in the U.S.S.R. is the assistance given in the destruction of vermin on farms and in forests, the fighting of forest fires, etc. Other directions in which the airplane has performed valuable work has been in connection with scientific research expeditions such as the Kara Sea expeditions as well as other expeditions to Spitzbergen and the Isle of Wrangel.

Lastly, with the assistance of civil aviation it was possible to transport matrices from one town to another to enable newspapers to be published simultaneously in several towns, and by means of airplane services, also, valuable time was saved in the transport of seals, fish and caviare from the Caspian to the Aral Sea.

New Railways Will Aid Manchurian Development

(Continued from page 279).

appliances are estimated to cost Y.70,000,000. Where are the moneys to come from to build these lines? Where are the Manchurian railway authorities to procure the technical skill and materials required? However fertile the soil may be and however hardworking and saving the people, we cannot expect them to be able to finance these tremendous and expensive engineering works. Funds must be looked for from abroad to be paid back from the earnings of their railways, which, with honest and efficient management, ought to be an easy task.

It will take years to build those lines—in fact they are to go with development of the country, one is so closely related to the other. They are interdependent. All these 3,600 miles cannot be built in a year and in fact they are not needed all at once. Building of 300 to 500 miles a year of new railway lines is brisk work in such a country as Manchuria, and there will be railway activity for some 10 years to come even if everything goes well with the country.

Manchuria will become a great buying market for manufactured goods. It already has undoubted possibilities to become a still greater producer and hence a better buyer.

The revenues and operating expenses of the existing railways cannot be given in definite figures. But it is common knowledge that the yearly revenue of the South Manchuria Railway of only 700 miles has been bigger than those of the other railways in China and Manchuria put together. This was true on a certain year but the figures on the Chinese railways are so hazy and undependable that such comparison is only indicative of the very good revenue of the South Manchuria Railway, while the results of operation of other lines in China are not satisfactory, due to dishonesty, free transportation for soldiers and some classes of passengers and constant raids upon railway coffers by warlords. It is no wonder these Chinese and Manchurian lines under such circumstances cannot give satisfactory results. The hardship is felt not only on these railways themselves, but upon the agriculture and trade which they serve.—*Japan Advertiser Annual Review.*

Soviet Lumber in Mukden

About a year ago the Soviets opened a lumber yard in Mukden known as the wholesale lumber department of the Chinese Eastern Railway, and during the past season have obtained a large part of the lumber business in this district. This department sells both retail and wholesale and has appointed a Chinese concern as agent for Mukden for handling the Chinese business. This concern states that it can sell about 30 carloads of lumber per year under normal conditions, and estimates that the Soviet lumber department sells approximately 100 carloads per year. The lumber department also has offices in Dairen and Newchwang, the lumber for Mukden being sent by steamship from Vladivostok to Newchwang and then by Chinese railway to Mukden. Besides their Mukden supply, a stock is carried in Newchwang. The bulk of their business is in boards rather than in logs, although they supply logs when desired. All of this lumber is red pine.—*Commerce Reports.*

Engineering Notes

INDUSTRIAL

OSAKA SEWERAGE.—The municipality of Osaka will embark during the year on the construction of a modern sewage system in the central and northern sections of the city. It is a five-year programme, with an outlay of Yen 17,000,000, of which Yen 12,101,400 will be raised by loan. The city intends eventually to modernize the entire sewage of the city. The central portion of the city embraces a total area of approximately 3,465 acres. The septic compartments will be established along the banks of the Kizugawa, where, after purifying, the sewage will be dumped into the river. The northern portion where the city intends to lay out modern sewer mains covers an area of some 2,450 acres. The sewage collected will be conducted into septic compartments, where two species of bacteria with the aid of accelerating chemicals will do the purifying operation.—*Eastern Engineering and Commerce.*

SHELL TANKS IN CHINA.—The Asiatic Petroleum Corporation has completed the erection of four 108-ft. by 33-ft. oil storage tanks, equipped with Wiggins roofs, at Pootung, 13 miles from Shanghai on the Whangpoo River, the scene of the recent hostilities between Japan and China. The new storage plant is situated on an island, and is accessible only by boats. Mr. W. A. F. Millinger, mechanical engineer of the Shell Oil Company, was in charge of the construction of the plant, which was erected by the Yuen Chong Tai Iron Works. All of the joints of the roofs were electrically welded by native welders.—*Oil News.*

LIGHTING OF LOYANG.—The Chinese Government has decided to appropriate $65,000 for installing electric light at Loyang, the temporary seat of Government.

IRON FOUNDRY FOR KOREA.—A Yen 8,000,000 iron foundry is to be erected in Korea by the Mitsubishi Mining Co., which owns a big mine in Kankyo Province, supposed to contain between 100,000,000 and 1,000,000,000 tons of ore. The percentage of iron, however, is small but investigations have convinced the company of the advisability of starting mining, as the magnetic separation process will enable it to carry on the business on a commercial basis. The proposed foundry will be erected in Seishin and construction will be started next year.

SULZER PLANT IN JAPAN.—Since 1926 a Sulzer borehole pumping plant has been working in the Yunagawa municipal waterworks. The borehole pump has three stages and works in conjunction with a vertical two-stage Sulzer high-lift centrifugal force pump, mounted above it on the same shaft. The set delivers 225 gals. per min. against a total head of 154-ft. The following is an extract from a report on the plant, recently received: "The pump is overhauled once a year. Up to the present it has only been necessary to replace some packing in the stuffing-box; all other parts of the pump are in excellent condition. The pump works 10 hours daily and has never given the slightest trouble."

DNIEPER POWER PROJECT.—The installation of the first three units of the Dnieper hydroelectric project were completed by March 19, and trial operation of the first aggregate was made on April 5. The turbine of the fourth had been set up, but its generator was only 50 per cent completed. The delay in the completion of the generator of this unit was due to the late arrival of equipment. Each turbine is of 84,000 horse-power and the generator of 77,500 kilovolt-amperes.

RAILWAYS

TO REHABILITATE LINE.—The first step towards the rehabilitation of the Peiping-Hankow Railway will be the repair of the dilapidated rolling stock, according to Mr. Ho Ching-wu, Chairman of the Administration Committee of the Railway, who has just returned from an inspection of the entire line. Owing to war and flood ravages during recent years, Mr. Ho says that the rolling-stock has suffered tremendously. He intends to have them repaired as soon as possible at the railway workshop in Changhsintien, near Peiping. Regarding the development of the Line, special attention will be given to improvement of freight traffic in order to bring additional revenue to the Railway.—*Kuo Min.*

SEEKING FUNDS.—Mr. Ku Meng-yu, Chinese Minister of Railways, is now negotiating for an advance of $870,000 from the British Boxer Indemnity Commission for the construction of the Laiyang-Shaokwan section of the Canton-Hankow railway. Construction work will begin as soon as the loan is made.

BRIDGE IN BURMA.—The contract for the supply and erection of 10 spans for a bridge across the Irrawaddy River near Mandalay, Burma, was recently awarded to a British firm in India. The bridge will consist of nine spans, each 360 feet long, and one span of 260 feet. A 350-foot service span will be used for erection purposes. The bridge when completed will carry the Burma Railways line across the river from Amarapura to Sagaing. The firm will supply and erect 10,900 tons of steel, 80 per cent of which will be supplied by an Indian iron and steel manufacturer. The 260-foot span has already been constructed in Calcutta and despatched to the bridge site, and one of the 360-foot spans has been erected.

SULZER BROTHERS

SHANGHAI ENGINEERING OFFICE

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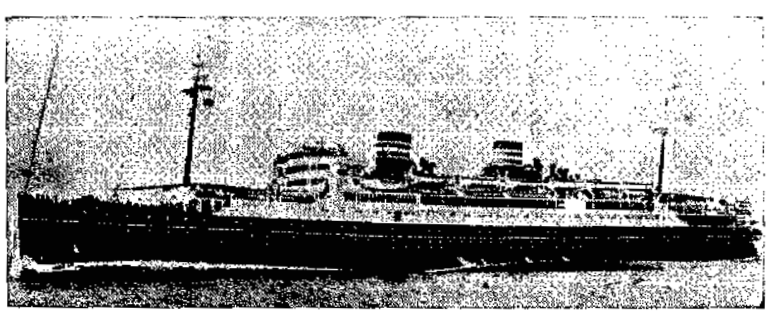

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ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW

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遠東時報

THE VALIDITY OF A TREATY

CHINESE SOLDIERS

A STRAW IN THE WIND

Bronson Rea Made Advisor

Vol. XXVIII JULY, 1932 No. 7

Engineering Notes

INDUSTRIAL

PROJECT IN SZECHUAN.—In pursuance of a scheme of the Chinese Government to establish a steel works in Szechuan, investigations are now being conducted by experts despatched from Nanking to report on the coal and iron producing areas of the province. The project, though still in a preliminary stage, is nevertheless regarded with great interest both by Government leaders and industrialists as it is intended to aid the development of the vast mineral resources for which Szechuan is famous.—*Kuo Min.*

PHONES IN CEYLON.—On the subject of the proposal by Imperial and International Communications, Ltd., to take over the Ceylon Government Telephone system, Mr. Brand, Manager of the Colombo branch of the Eastern Telegraph Co. said he was authorized to issue the following statement for publication:—"The Imperial and International Communications, Ltd., has proposed to the Government of Ceylon, through the Minister of Communications and Works, the formation of a Ceylonese company, with a capital of rupees ten million, for the purpose of exploiting and developing the telephone system of Ceylon under the authority of the Government."

RAILWAYS

S.M.R. IMPROVEMENTS.—The South Manchurian Railway has a program of new works involving expenditure of £12,000,000 over the next three years, and arrangements are being made for an increase in capital to finance the scheme.—*Eastern Engineering and Commerce.*

DEVELOPMENT OF POSHAN.—To facilitate transportation of coal, the Kiaochow-Tsinan Railway has decided to purchase the light railway from Poshan, estimated at from $900,000 to $1,200,000. It is planned to establish an electric plant at Poshan to develop industries along the line.

RAILWAY IN SZECHWAN.—Preliminary survey for the Chengtu-Chungking Railway has been completed, the cost of construction being estimated at $24,000,000. This railway will be of great commercial and strategic importance, as it will link up Chengtu, the provincial capital of Szechwan, with Chungking, on the Yangtze. For a distance of slightly over 300 miles the projected line will pass through a fertile region which is at present partly served by a highway. Starting from Chengtu, the railway will parallel the Chengtu-Chungking highway to Neikiang. At this city the railway will continue south to Lungchang and Shaochiufang before turning north-eastward to Yungchang. From Yungchang it will again run parallel with the highway to Yungchuan, thence to Chungking.—*Eastern Engineering and Commerce.*

CANTON-HANKOW RAILWAY.—By order of the Nanking Ministry of Railways, a monthly appropriation of $100,000 is to be granted to the Canton-Shiuchow Railway Administration (which is the southern section of the Canton-Hankow Railway) specially for the purpose of completing that section of the Canton-Hankow Railway. The Canton-Shiuchow Railway Administration has been undertaking engineering operations on this last link between Chuchow, in central Hunan, and Shiuchow, Kwangtung. Owing to poor business conditions, however, the Administration is now unable to meet the construction expenses, which are estimated at $100,000 per month, and has applied to the Ministry for aid. As the completion of the Canton-Hankow Railway is one of the more urgent measures in the Ministry's program, the Ministry is anxious that construction work should not be suspended.—*Kuo Min.*

ELECTRICAL

JAPANESE CABLES. The Sumitomo Cable Co. of Osaka, which belongs to the copper group of the same name, has commenced the erection of an extensive cable factory which, it is claimed, will be able to cover most of the cable requirements of Japan.

OPPOSES ENTERPRISE.—In an appeal to the Executive and Control Yuans, in Nanking, the Chinese Electric Operators' Guild, expressing opposition to the reported proposal for the establishment in Hangchow of an electric company with the help of a loan from Americans, requests the Government not to grant the permission for the proposed electric enterprise in Hangchow.

IN PHILIPPINES.—The Legislature of the Philippines has approved measures to install, operate and maintain electric light, heat and power plants in the Municipalities of Pontevedra (Occidental Negros), Gerona and Pura (Tarlac), Ramos (Tarlac), Bacoor (Cavite), Apalit, Macabebe, Masantol, San Simon and San Luis (Pampanaga), and Tangub (Occidental Misamis), Philippine Islands. An Act granting to Davao Telephone Co. a franchise to install, operate and maintain a telephone system in the Province of Davao and any municipality or municipalities thereof has also been approved.—*Eastern Engineering and Commerce.*

COMMUNICATIONS

TELEPHONES FOR JAPAN.—The installation of new telephones at the rate of 23,000 per year is being planned by the Japanese Ministry of Communications.

ROAD WORK IN CHINA.—Early completion of the Tihua-Hsinghsinghsia section of the Kansu-Sinkiang National Highway has been ordered by the Chinese Ministry of Railways. This section covers about 315 miles, part of which has been already completed. The Ministry has also issued an order to the Suiyuan Reconstruction Department for the early construction of the Pingtichuan-Pangkiang highway of about 150 miles, an important artery in the proposed network of communications in the north-west. Chekiang Reconstruction Department has decided to complete eight highways during the present year.

HONGKONG TELEPHONES.—At the seventh meeting of the Hongkong Telephone Co. the chairman indicated the extension, in the near future, of the service in the New Territories. He also said that the Canton-Hongkong service was much in demand and that the success of the project was assured. To meet orders for installations the company has laid down during the past year 3,293,426 circuit miles of underground cables and covered distribution. There must, said the chairman, be very few telephone administrations, where such a large percentage of the subscribers' lines was served entirely by underground cables.—*Eastern Engineering and Commerce.*

COMMUNICATIONS ROADS IN CHINA. It is reported that the proposal calling for the appropriation of $10 million from the Boxer Indemnity Refund as a loan to the Kiangsi Provincial Government for the construction of motor highways in that province has received the official sanction of the Central Authorities. The project, which was proposed by General Hsiung Shih-hui, Chairman of the Kiangsi Provincial Government, provides for the building of trunk lines connecting the important cities of Kiangsi with the provinces of Chekiang, Fukien and Kwangtung, so as to facilitate communications and, at the same time, assist in the anti-Red campaign.

JAPANESE AIRPORTS.—Partially as a relief measure for the unemployed, the Imperial Aviation Society of Japan has decided to launch a movement for the construction of 200 air ports throughout the country. Officials of the Aviation Society claim that such a program would not only contribute to the alleviation of the unemployment situation, but would also aid the progress of civilian aviation, besides being of great value in strengthening Japan's military defences.

SHIPPING

NEW SHIPYARDS.—The greatest shipbuilding yards in the U.S.S.R. are now under construction in Habarovsk. All the necessary material for the work has been brought to the site and about 4,000 workers and 100 engineers and technicians are now active on the job.—*Tass Agency.*

PROPOSED NEW HARBOR.—A survey has been made of the proposed harbor at the mouth of the Hangchow River, planned by the Chinese Reconstruction Commission. The site is only about 60 miles from Shanghai. There are two prosperous towns near, Kanpu and Chapu, and there are channels in Hangchow Bay, from 24 to 30 feet in depth but there is no railway, nor are there any deep water channels for vessels carrying freight for and from points in the interior. According to plans laid down by Dr. Sun Yat-sen, the construction of the "Great Eastern" harbor should be undertaken simultaneously with the building of a south-eastern railway system and the improvement of the waterways south of the Yangtze for carrying freight to and from inland points. *Eastern Engineering and Commerce.*

NEW SUNGARI WHARF.—The Harbin Chamber of Commerce, the Binchang Transportation Association, and the Chambers of Commerce of various districts along the Sungari and Heilungkiang Rivers, realizing the need of a new wharf in the Binchang district, have leased land, and petitioned the Administration for approval of the scheme. This will be the third wharf in Binchang.

MINING

YUNNAN TIN EXPORTS.—Exports of tin from Yunnan in the third quarter of last year amounted to 29,252 piculs, making the total for the nine months 81,965 piculs, or 4,878 tons, as against 80,546 piculs, or 4,794 tons for the same period of 1930.

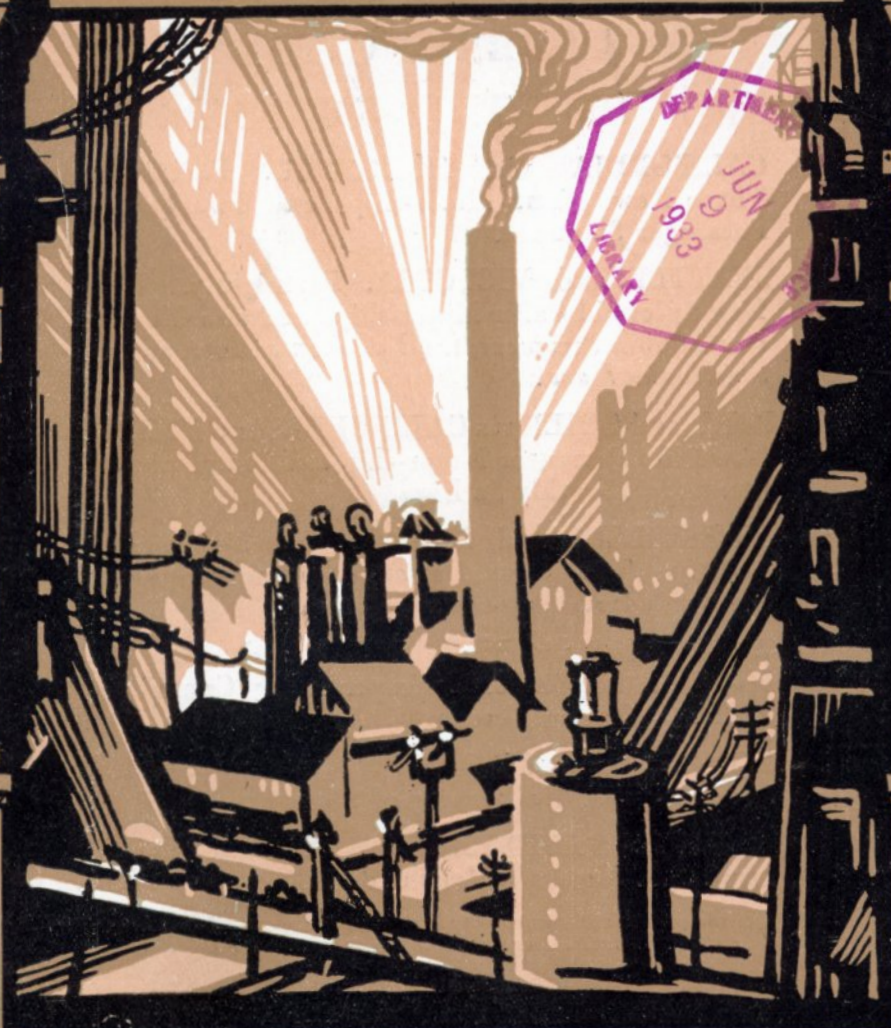
GOLD IN THE F.M.S.—In the Batang Padang district of Perak, where gold is generally won in the course of working tin ore, the tendency has been for the rate of output to decrease. The following are particulars of past and recent production:—

	1931	*1931*	*1932*
	Total	*Av. p. month.*	*March.*
	oz.		*oz.*
Raub Aust. Gold Mines	24,727	2,060	2,561
Batang Padang ..	2,294	191	109

The depressed state of the tin industry has naturally stimulated activities in relation to search for gold and a number of parties have gone prospecting in Pahang and Kelantan where, especially in the latter state, gold is known to occur in the mountainous country running northward into South Siam. It has recently been proposed to form a prospecting and development company with headquarters in Kuala Lumpur to investigate potential gold-bearing areas in this peninsula and in the Dutch East Indies. The proposed capital to be authorized is $1,000,000 of which $100,000 would be called up.

ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW



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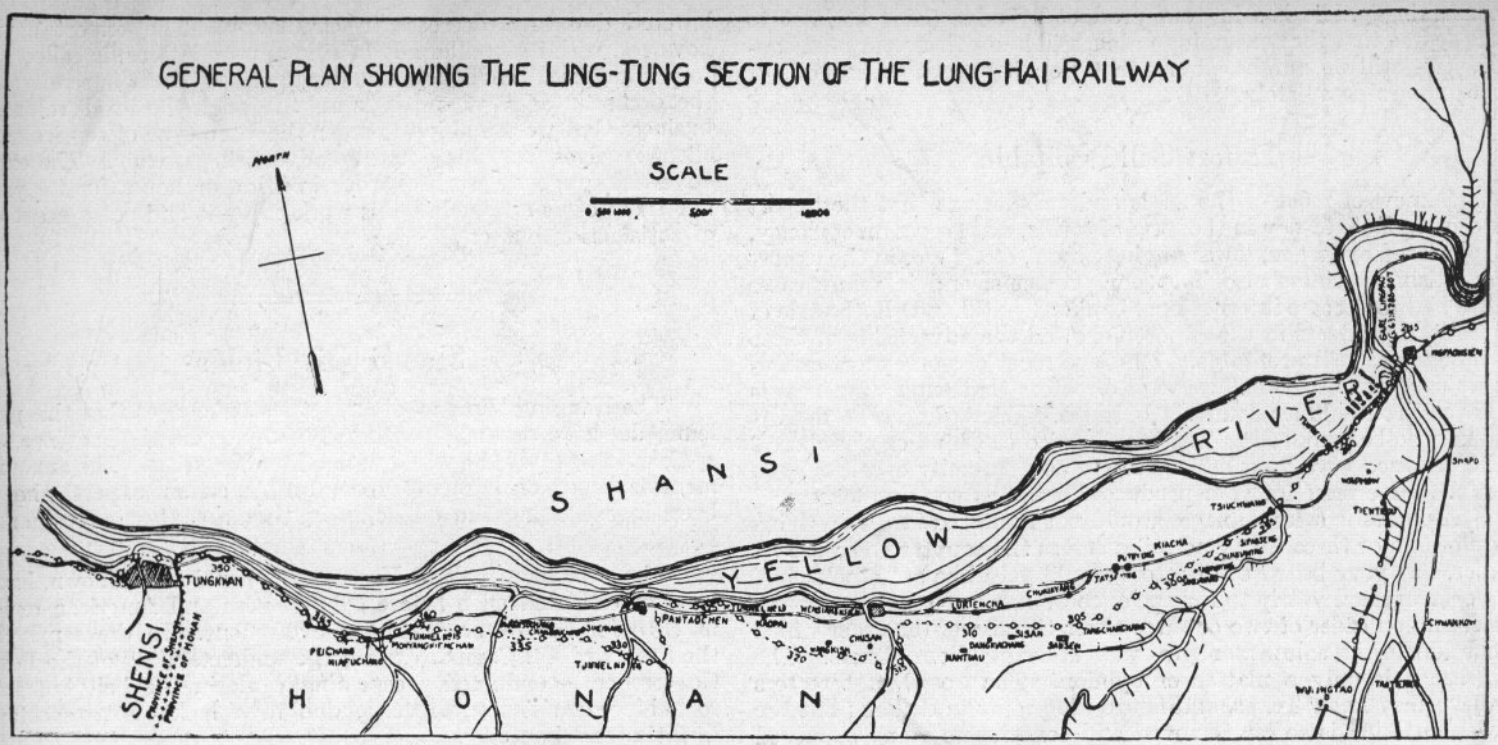


Fig. 2.—Section Lingpao-Tungkwan 72 km. nearing completion

Progress of Extension Work on Lunghai Railway*

By H. H. LING, Assistant Director, Lunghai Railway, In Charge Construction Section Lingpao-Tungkwan ; Director and Engineer-in-Chief, Section Tungkwan-Sianfu

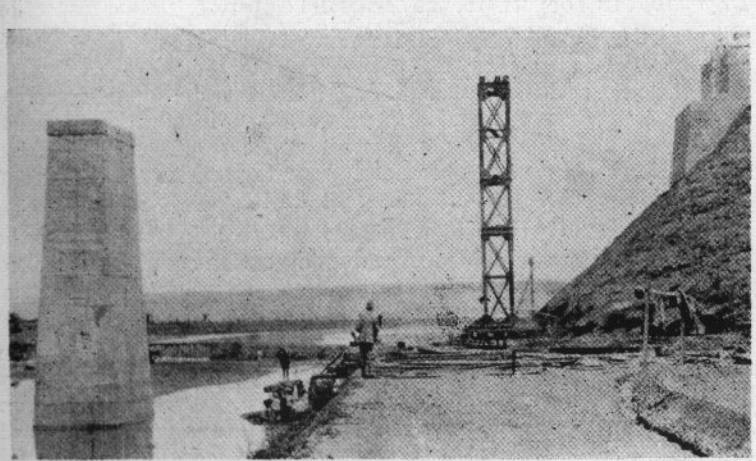
THE Lunghai Railway is at present the only east-and-west trunk line in the central part of China. It extends to the sea with a proposed Silientao Harbor in the east, and with Lanchowfu, the capital city of Kansu Province, as its western terminus. This line, when completed, with a length of 1,600 km., will, undoubtedly be one of the most important trunk lines of the country, politically, economically and culturally. From the engineering point of view, the western section of the line passes through the typical loess formation along the Yellow River with heavy earthwork, tunnelling, and many crossings over deep valleys. It has the longest tunnel of the Chinese Government Railways, tunnel No. 4, at Siashiyi, about 220 km. west of Chengchow, with a length of 1,779.58 meters, partially through rock. The present extension work also passes through difficult regions with heavy tunnelling work and interesting projects. Despite the fact that this line offers so many features of engineering interest, very little is known to the profession, and very little has been written elsewhere in other papers.

Present Situation

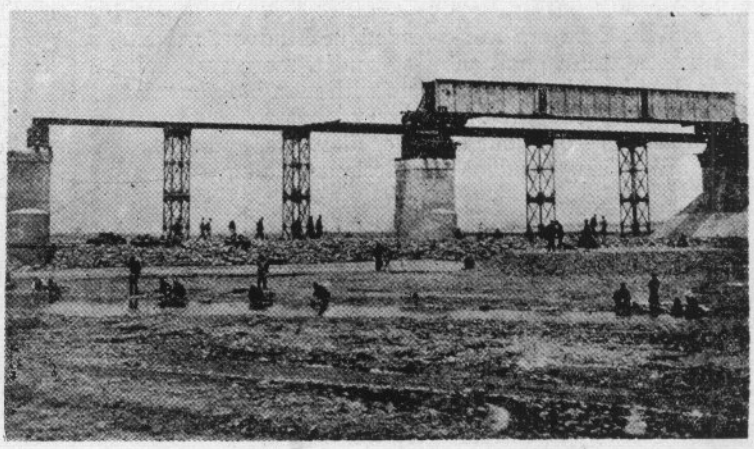
The accompanying diagram (Fig. 1) shows the Lunghai Railway with operating section, Tapu to Lingpao, 826 km. ; construction section, Lingpao to Tungkwan, 72 km., also Tungkwan to Sianfu, 130 km. The rest of the line, Sianfu to Lanchowfu, about 660 km., only been reconnaissanced.

When the line reached Shanchow in 1924, further extension from Shanchow to Tungkwan, 98 km., was continued. Owing to lack of funds, only 26 km. of line, from Shangchow to Lingpao, was completed and operated in 1926, and the remaining section, Lingpao to Tungkwan, 72 km., with a certain amount of work started, was unable to be carried on.

**Journal of the Association of Chinese and American Engineers.*



Tson Sang Bridge Ready for Erection



Launching First Span of the Lingpao Bridge

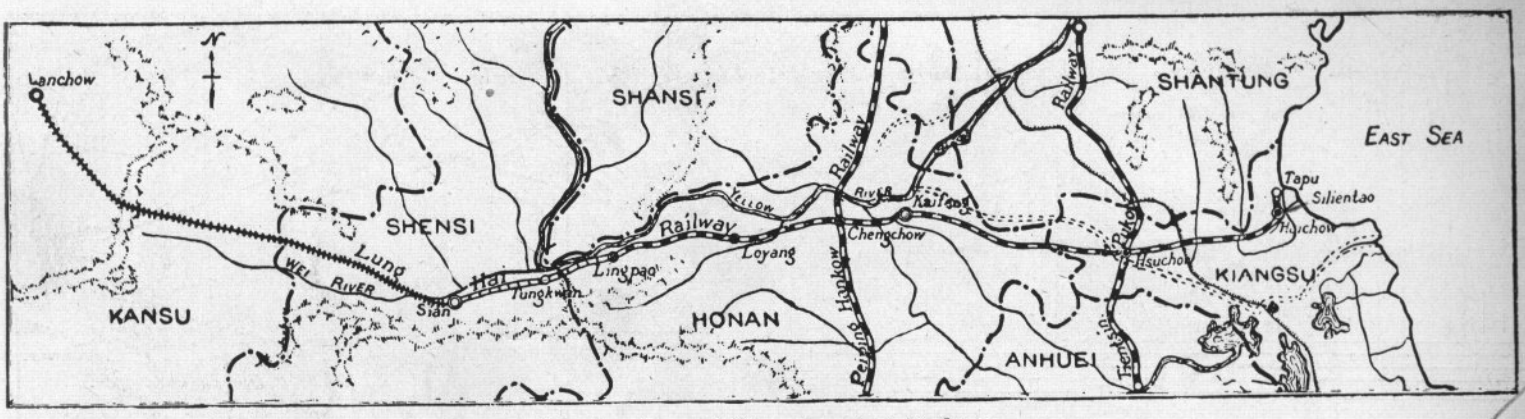


Fig. 1.—General Plan Lunghai Railway

About a year later, as a result of negotiation between the Governments of Belgium and China, on the disposal of the Belgian portion of the Boxer Indemnity Fund, 40 per cent of the Fund amounting to approximately G.$1,800,000, was appropriated to the Lunghai Railway for the buying of materials in Belgium with the object of early completion of the section. The amount for bridges, rails and steel sleepers for the section did not require the entire portion of the appropriation, and, as this fund could not be used to pay for the construction; for labor and other materials, its balance was used to buy a number of locomotives and cars from Belgium for the operating section. This then paid back the cost, out of its operating revenue, to finance the construction. With this scheme carefully planned, the remaining work of this section was able to be continued and to approach completion.

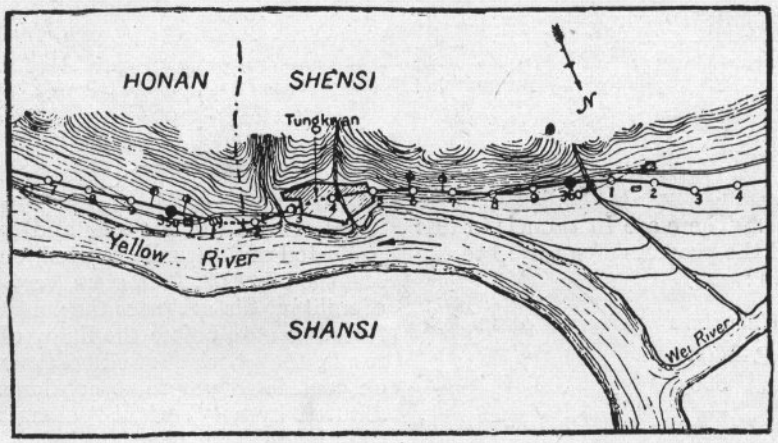


Fig. 3.—Tungkwan City and Vicinity

Difficult Transportation

When the construction work of this section was resumed at the end of 1930, after the suspension of nearly a year, the transportation of large quantities of various materials from the seaports of arrival to the worksite became the first difficult problem for the railroad officials to solve. These materials included about 8,200 tons of rails and accessories, 3,300 tons of steel sleepers (50,000 pieces), 2,500 tons of bridges and about 500 tons of iron and steel products, all the above being scattered in Woosung, Pukow and Tsingtao; about 4,000 tons of wooden sleepers to arrive at Tapu (the present river port of Lunghai), and about 6,000 tons of cement to be taken at Tangshan. All these materials, amounting to some 25,000 tons were mostly over 1,000 km. from the worksite. With the general shortage of rolling stock, particularly locomotive and flat cars for bridges and rails, the handling of these materials to the worksite was by no means an easy task. Besides these materials, the railroad had to handle large quantities of stone and ballast, the former over a distance of 70 km., and the latter for a much shorter distance. Thanks to the friendly help of the Tsinpu, Kiaotsi, Peining and Pinghan Railways, the matter was greatly facilitated.

Lingpao-Tungkwan Section, 72 km.—Difficult Work

Fig. 2 shows the general plan of the section Lingpao to Tungkwan now nearing completion. In this section, the line lies along the south of the Yellow River with several points very close to the river. Going over the loess formation with sudden rises and falls, it necessitates frequent tunnelling, heavy cuttings, high embank-

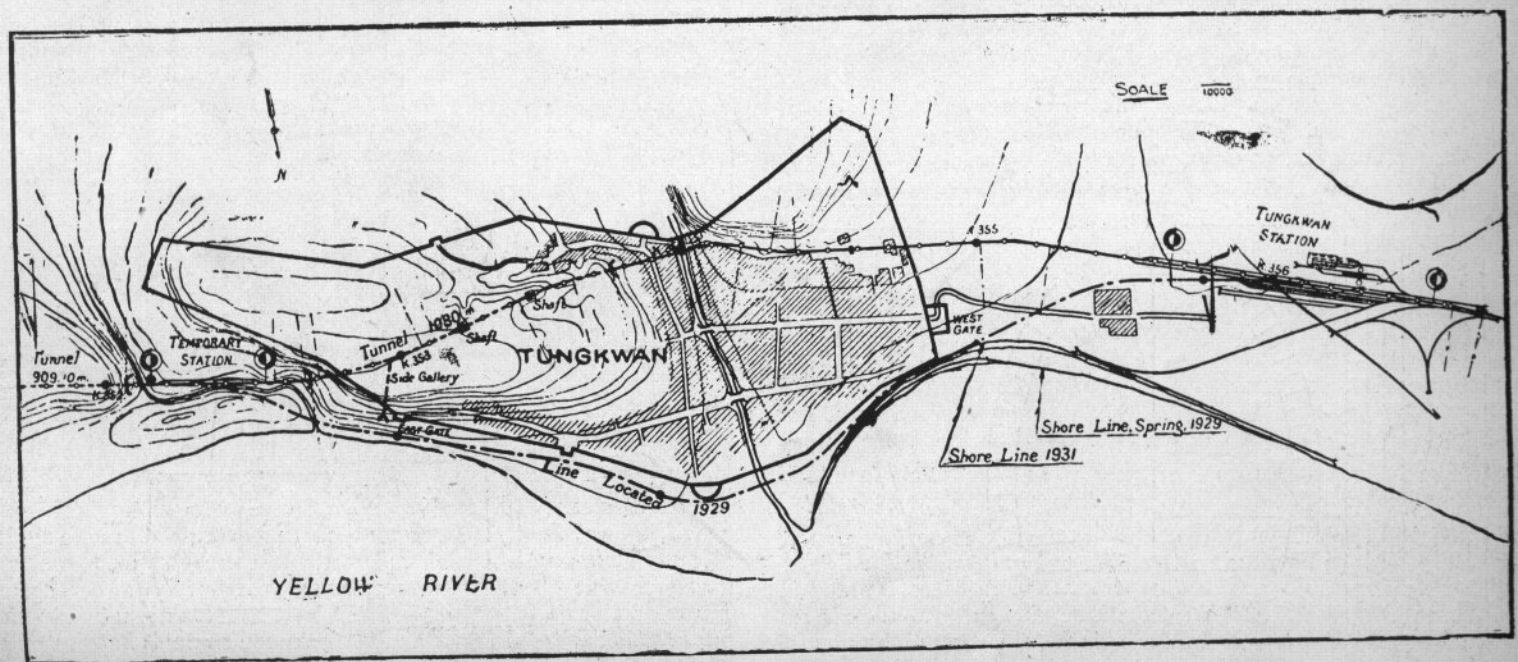


Fig. 4.—Tungkwan City showing Tunnel and Station

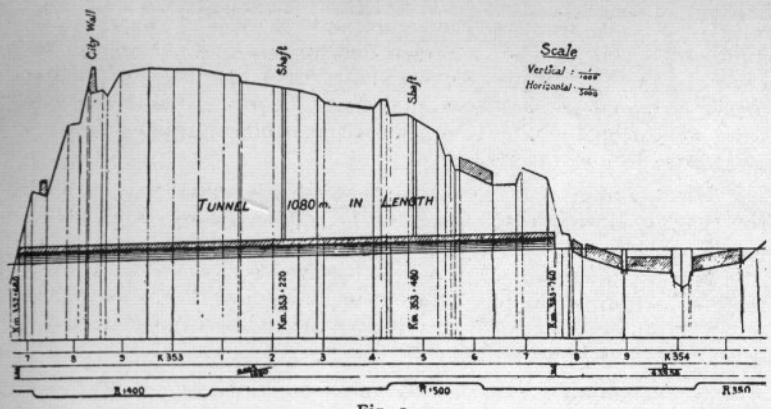
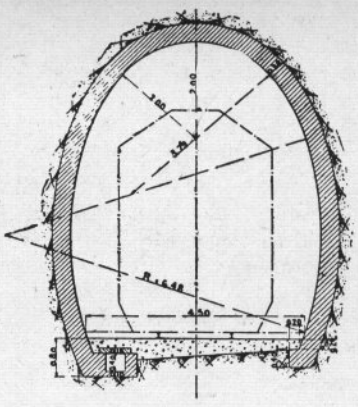


Fig. 5.



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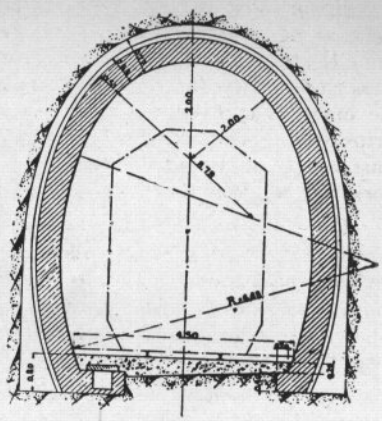

Fig. 7.

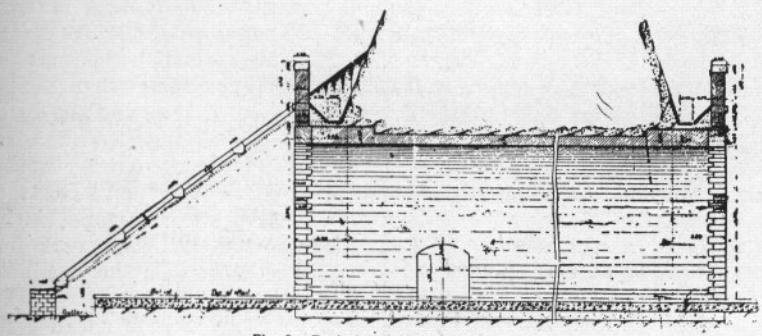

Fig. 8. Typical Longitudinal Section

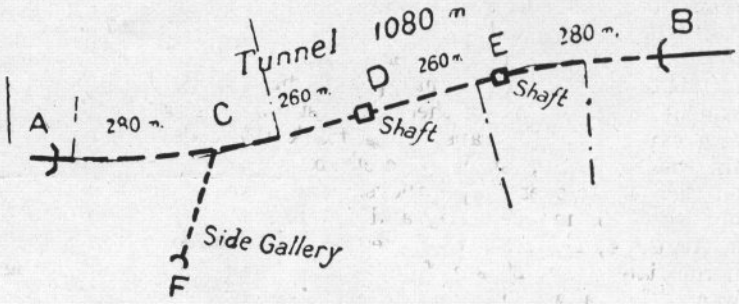

Fig. 12.

ments and crossings of deep valleys. There are 10 tunnels in this section, their length, alignment, and the progress of work up to the end of August, 1931, being as follows :

No.	*Length*	*Grade*	*Curvature*	*Per cent completed*
1	90.50 m	0.008	R=600 m	100%
2	621.20	0.008	600	100
3	90.30	0.008	—	100
4	107.40	0.008	—	100
5	622.60	0.007	350 600	100
6	695.00	0.010 0.009	1,000 500	100
7	631.84	0.0062	—	100
8	395.00	0.010	1,000	100
9	909.10	0.010	1,000	95
10	1,080.00	0.005	1,400 1,500	Work started Aug. 1, 1931.

Between tunnels four and five, there were two more tunnels projected and actually started, one with a length of 788.12 meters, and the other 592.00 meters, very close to each other. On account of military disturbances the construction work of these tunnels was forced to stop before the lining of the arches was put on, and as a result, they both showed cracks of various degrees, and were later on considered unsafe to continue. These tunnels were then substituted by a "Variant" along the Yellow River, and, since its completion, the "Variant" has shown a considerable degree of safety even as a permanent substitute, and the future tunnels may not become necessary at all when the present "Variant" is properly improved and maintained.

The last mentioned tunnel in the above table is located at Tungkwan, the general design and method of construction of which will be found in the latter part of this paper.

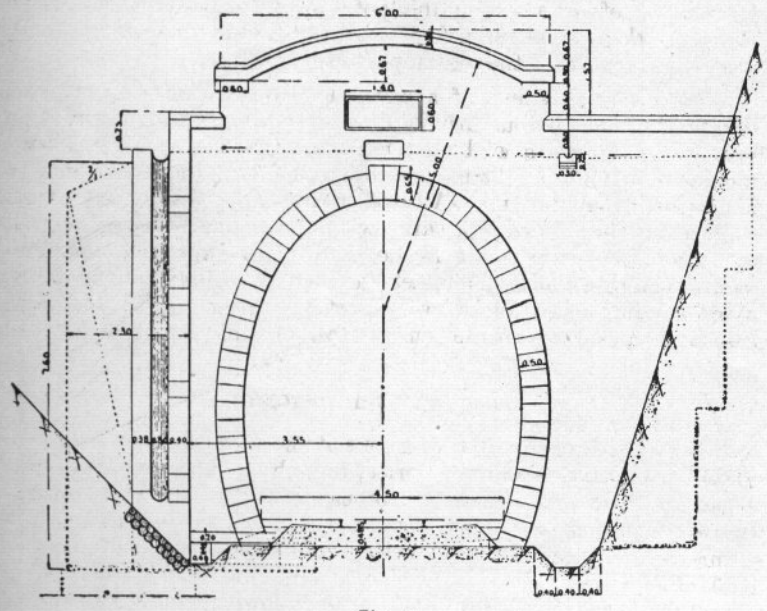

Fig. 9.

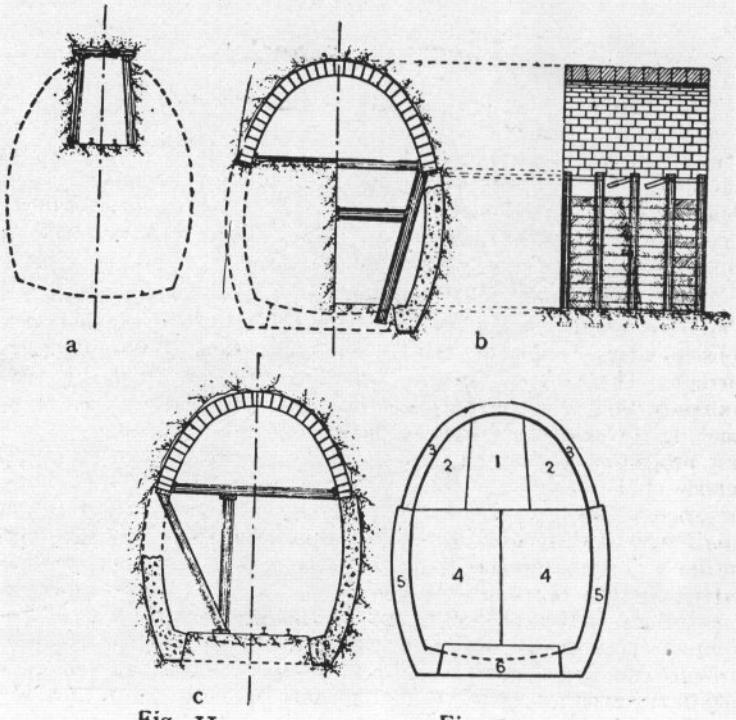

Fig. 11.

Fig. 10.

Being close to the Yellow River, the line needed protection work along it, and this was done at various points, particularly along the first several kilometers near the series of tunnels. Wooden piles were driven in the direction perpendicular to the direction of the current at frequent intervels and were woven with bamboo strips surrounded by heavy pieces of stone. After the first flood season, the above work seemed to be quite effective and similar work will be done at other points.

The nature of the soil along this section shows considerable variation in the degree of consistency, and therefore different slopes are adopted for earth cutting, varying from vertical cuts to about one to one slope. This region is in general very windy, carrying usually a large quantity of sand, making it rather difficult to keep the permanent way in clean condition.

The rail section used for this section of the line is Chinese Government Standard 43 kg. rail of 12 meters in length. 50,000 pieces of steel sleepers were purchased in Belgium, the remaining 90,000 required in this section are of Oregon pine and oak, chosen because of a lower first cost. Steel sleepers are used as much as possible in tunnels and on curves and heavy grade. 17 sleepers, steel or wooden, are used under a pair of rails. Track laying is now being done mostly by man power, due to lack of engines and frequent interruptions at the bridge sites. A great handicap is being experienced in transporting track materials by small flat cars over light rails, especially in climbing over high embankments and then going over deep valleys. The speed of track laying is only about 500 meters a day and 800 meters in a day and night. On August 4, 1931, the track reached Wenhsiang, an important intermediate point, 29 km. from Lingpao and 43 km. from Tungkwan. The railway has begun selling tickets to those who are willing to make a short ride on the construction train in coming back from Wenhsiang to Lingpao.

The longest bridge of this section is the Lingpao bridge having 12 spans of 30 m. each. Most of the bridges in this section are of deck plate girder type, and their design is apparently to suit the local conditions and available equipment for erection. All the bridges are good for Cooper's E-50 loading and their design and construction according to the Chinese Government Standards. Foundations of these bridges are all on wooden piles. On account of the topography, bridge piers are usually very tall, some of them being as high as 15 meters.

The track reached Tungkwan in December, 1931. Pending the completion of the Tungkwan tunnel, there will be a temporary station located near the East Gate of the city outside of the east portal of the tunnel to enable temporary handling of passengers and freight. The Tungkwan station will be outside of the West Gate, and will be ready for traffic in 1932, upon completion of the Tungkwan tunnel.

Tungkwan Tunnel

The city of Tungkwan, as seen in Fig. 3 and Fig. 4 is located along the south side of the Yellow River. The southern half of the city is built on mountains and only the north-western part is flat and inhabited. The city within the walls is of an odd shape having about 2½ km. in length and 1 km. in width. The city was formerly a point of military importance, and, on account of its situation, is still a commercial center in that territory.

Here the Yellow River takes a great turn after meeting the Wei River, and changes its course from southward to eastward. Consequently, Tungkwan is the point of attack of the changing current. The railroad line approaching the city from the east is already difficult, necessitating a tunnel of 909.10 meters just before reaching the temporary station outside of the East Gate. It was first projected to run the line around the city along the river outside of the city wall. (Fig. 4) This line will give the least disturbance to the city which is already small in area. But it was later found that this first projected line located some years ago when the line was some distance from the river, was already immersed in water in certain portions very close to the city wall, which, however, was strongly built to protect the city. Consequently its adoption was deemed impracticable, and a tunnel under a part of the city and through the other part was decided upon. This line offers a certain disturbance to the city, but only the less dense area will be affected.

The tunnel finally located, has its eastern portal just outside of the city wall near the East Gate, and its western portal in the middle of the city. The alignment has two reversed curves of 1,400 m. and 1,500 m. radius respectively. The alignment was chosen for the convenience of the two portals. The tunnel has a length of 1,080 meters and goes up from the east on uniform grade of 0.005 m. per meter as shown in Fig. 5.

The standard section of the tunnel, like other tunnels along the line, is shown in Fig. 6 for earth of good consistency, and in Fig. 7 for earth consistency of lesser degrees to be decided by the engineer in charge in accordance with the conditions. The thickness of the tunnel lining in the former case is 0.38 m, and in the latter, 0.51, 0.63 and 0.77 m. The areas of earthwork and lining are shown as follows :

Thickness of Lining	*Amount Earthwork*	*Amount Lining*
0.38 m	35.062 m²	6.796 m²
0.51	37.370	9.104
0.63	39.547	10.281
0.77	43.222	14.956

Fig. 8 shows the longitudinal section of the tunnel and Fig. 9 a typical front view of the portal.

The tunnel arch will be lined inside with concrete either placed in forms or in the form of precast blocks. During the winter months, when outside casting is impracticable, mixing inside the tunnel and mixture placed in forms will be used. The mixture is composed of 2 cu.m. of broken stone, 1 cu.m. of sand and two barrels of cement resulting in 2 cu.m. of concrete. The cement mortar for concrete blocks is made of 1 cu.m. of clean sand with two barrels of cement.

The Lunghai Railway has been adopting the Belgian system of driving tunnels and the local contractors are quite accustomed to this kind of work. As the tunnel will pass through loess formation of rather a uniform nature with no likelihood of encountering hard strata nor water accumulation, the driving will entirely be done by hand work with small dump cars pushed on light rails for the removal of the earth. Fig. 10 shows the order of operation where the head gallery No. 1 will be driven first, then 2, 2, and then the lining of arch 3; and when 4, 4, is removed, wall linings 5, 5, will be followed and then the bottom 6. While head gallery 1 is small in size, its practical depth on a tangent, where there is no artificial means of ventilation, is limited to about 300 meters, above which the work will become very uncomfortable. Fig. 11, a. b. and c. show the various stages during progress of the work.

Fig. 12 shows the alignment of the tunnel with side gallery CF and vertical shafts at D and E. These shafts D and E are used and so located primarily for ventilation during construction, and are not designed for removal of earth. Shaft E may be filled up later after tunnel is completed, leaving only shaft D for ventilation when tunnel is opened for traffic. The side gallery CF is designed for removal of earth and dumping of same on the bank of the Yellow River, as there is no room for depositing a large quantity of earth from the tunnel near the eastern portal.

The average speed of a working day of a good contractor obtained from previous driving records is about two meters deep for ventilating shafts, eight meters for head gallery and side gallery, four meters for arch lining, six meters for side wall lining and 16 meters for bottom lining. All these refer to hand driving with small wagons for the removal of earth without machinery being resorted to. The work of this tunnel is not likely to encounter many unforeseen difficulties, and is not likely to be delayed due to unfavorable weather conditions. Work was started August 1, 1931, and with the above speed, the entire tunnel can be completed in nine months.

Cost of Construction

Before calling for bids, various items of work were first estimated in quantity and unity price, and the bidders were requested to submit their unit values for comparison. The estimated quantities are by no means exact, but close enough for estimation and comparison. The construction of the tunnel was bid upon together with other works in the city of Tungkwan, the tunnel alone being about 60 per cent of the total. The following table shows the

itemized work and unit price of the successful bidder for the tunnel :

Item of Work	*Quantity estimated*	*Unit cost*	*Total cost*
1. Cutting in loess mingled or not with stone and where pickaxes or explosives are not needed. Price including excavation, timbering, airing, lighting, draining and hauling to outside of tunnel, and afterwards to a ... ... maximum distance of 100 m. from the tunnel, either in baskets or tip wagons or wheelbarrows with dumping on spots assigned by the Administration.	43,500 m³	$1.90	$82,650
2. Driving air shaft where pickaxes or explosives are not needed. Price including excavation, timbering, removal and laying of earth near the shaft :			
(*a*) One shaft with estimated depth of 75 m.	300 m³	4.50	1,350
(*b*) One shaft with estimated depth of 60 m.	240 m³	3.50	840
3. Concrete blocks with concrete D and mortar D for lining of arches including timber centering, etc. ...	3,350 m³	18.80	62,980
4. Concrete D put in place and rammed	7,580 m³	13.20	100,056
5. Add price block lining inside tunnel	10,930 m³	1.30	14,209
6. Concrete C for tunnel portals ...	300 m³	11.40	3,420
7. Wooden forms for concrete with curved surface including all necessary supplies	8,800 m³	1.80	15,840
8. Add. price for transportation of sand and gravel for lining beyond first 1,000 m :			
(*a*) For broken stone and gravel. Additional haul estimated within 1,000 m.	11,230 m³	0.60	6,738
(*b*) For sand, Additional haul within 1,000 m.	5,615 m³	0.60	3,369
			$292,452

From the above table, it will be found that the total cost is $292,452, to which 10 per cent is added for extra work, making a total of about $322,000. For a tunnel of 1,080 meters, this would mean an average cost of $298 per meter. The available figures for the average cost of other tunnels in this section completed within the last two years are as follows :

No.	*Length*	*Total cost*	*Average per meter*
1.	90.50 m.	$ 26,955.56	$297.85
2.	621.20	163,684.56	263.50
3.	90.30	33,320.16	369.00
4.	107.40	37,943.66	353.30
5.	622.60	181,997.38	292.31
6.	395.00	95,320.15	241.31

The Lunghai Railway has a contract with the Chi Hsin Cement Co. for the supply of cement to be delivered at Tangshan at a cost of $23.20 per ton of six barrels. At the present time, the railway furnishes the cement to the building contractor at Shanchow store and charges the contractor at a cost of $31.00 per ton according to the number of barrels actually put into work checked by the railway engineer in charge.

Tungkwan-Sianfu Section

With the Lingpao-Tungkwan Section completed the Ministry of Railways urges the line to be further extended to Sianfu. According to the resolutions adopted by the Central Government, this section is to be constructed out of the proceeds of the Russian Indemnity Fund. As this fund has not yet been realized, the Ministry of Railways is making certain appropriations in order to start the work as soon as possible. This section along the south of the Wei River to as far as Sianfu, a distance of 130 km., goes over much easier country than the previous section and passes through numerous fascinating points of historical interest. Earth work for the first 24 km. was started July 1, 1931. If funds are available in accordance with the needs, this section may be finished in 18 months.

Tokyo Plans Huge Reservoir

As a measure to free Tokyo permanently from difficulties arising through the lack of a sufficient water supply during the summer months, the construction of a vast reservoir in Nish-Tama Gun, on the outskirts of the city, at a cost of Y.39,000,000, has been approved by a special committee of the municipality in charge of waterworks, and construction is scheduled to commence in the early part of October.

The proposed artificial lake, will have a total capacity of 6,600,000,000 cubic feet of water, which is approximately 13 times greater than the reservoir at Murayama, which at present is the largest water supply the capital has.

At present the City of Tokyo is supplied with water from two main sources, one the Murayama reservoir and the other the one at Yamaguchi, which, although actually being used, has not yet been fully completed. These two reservoirs, the waterworks committee points out, would not be enough for the needs of the city, at the present rate of expansion, by 1935, when a serious shortage of water would be felt unless something were done. When the proposed reservoir is completed and is put in use the authorities estimate that the total supply of water for the city will be brought up to 1,320,000 cubic feet a day, which will be more than ample even if in the meantime the population of Greater Tokyo has reached the 5,500,000 mark, as compared with the present population of about 5,000,000. In fact, it is said that with the new reservoir Tokyo is not likely to suffer from any serious shortage of water at least till 1955.

Due to its enormous size, the construction area of the new reservoir now includes a number of small villages, which as construction work is pushed will be demolished and taken away. Such places include the Okawachi Village, in Nish-Tama, the Kosuge Village, and the Takayama Village, both in Yamanashi Prefecture. In one part nearer the Tama River a huge dam with a depth of 134 members will be dug, which will necessitate the removal of entire Okawachi Village.

Municipal authorities, also have decided upon the construction of a filtering station on a large scale near the present Murayama reservoir, while additional plans are being considered for the establishment of a big hydro-electric plant utilizing the dam of the proposed lake.

Yokohama, the city which until last year had been almost annually suffering from a shortage of water every hot season, due to increasing consumption, now has been entirely freed from this fear with the completion recently of a new filtering station capable of holding 750,000 koku (a koku is about four gallons) of water at Nishiya. The site of the station is to the west of the port city about two miles' distance from the railway station at Hodogaya.

The main feature of the Nishiya water plant is the water filteration equipment, which consists of four gigantic filtering pumps, each with a daily capacity of 260,000 koku, which amounts to about five and a half gallons of water for each citizen, and exactly double the quantity per capita until last year. The present works is the third extension enterprise in Yokohama since the establishment of the city's first reservoir in 1885, and also marks the completion of the first stage of a public works construction programme, the second stage of which provides the laying of 1,100 milimeter water mains in the district of Tsurumi, and is expected to be completed by the end of the year.

With the putting into effect of the Nishiya plant it is thought that the up-town parts of Yokohama, including Bluft, Negihi and Sagiyama, where the supply of water has always been poor on account of weak pressure, will experience no more difficulty in obtaining water.—*Japan Advertiser.*

Engineering Notes

RAILWAYS

LUNGHAI LINE EXTENSION.—Work has been started on the extension of the eastern section of the Lunghai Railway and the construction of a harbor at Laoyiao. The new section, which is 56 *li* in length, will be built in two sections, namely, from Sinpu to Hukou, 24 *li*, and from Hukou to Laoyiao, 15 kilometers long. The total cost of the construction of the railway and the harbor is estimated at about $2,000,000 and the whole work is scheduled to be completed in June, 1933.

LOAN FOR RAILWAY.—The Chinese Ministry of Railways is understood to be negotiating with the Board of Trustees in charge of the British Boxer Indemnity Refund for a loan of $875,000 for the completion of the Canton-Hankow Railway. For the last link between Shiuchow, in northern Kwangtung, and Chuchow, in central Hunan, a sum of $175,000 will be required for survey work, and $700,000 for making the road-bed and laying the tracks.

TRUNK RAILWAYS PLANNED.—In order to develop communication facilities in the southern provinces of Hunan, Kiangsi, Kwangtung and Fukien, in China, the Central Government is considering the construction of three main railways connecting the four provinces. According to tentative plans, Kiangsi will be the center from which the three trunk lines will radiate. It is understood that arrangements will be made for the allocation of a portion of the Boxer Indemnity Refunds for construction expenses. The authorities recently ordered that work on the inter-provincial highways linking Hunan, Kiangsi, Fukien, Hupeh, Anhwei and Honan be expedited, as it was felt that lack of communications has been responsible to a large extent for bandit activities in those provinces.

ELECTRIFICATION IN JAPAN.—The Shima Electric Railway in Miye Prefecture, Japan, is to be extended from Toba to Futami at a cost of Y.600,000. Investigations into railway electrification in Japan show that of the 14,832 km. of State Railway only 2.4 per cent is electrified. There are 7,108 km. of local railways, and of this 53 per cent is electrified. Out of 2,695 km. of tramways, 2,075 km. is electrified, chiefly at 600-v. Most of the State Railway operates at 1,500-v., while just over half of the local railways are run at 1,500-v., the remainder employing 1,200 and 600-v.—*Eastern Engineering and Commerce.*

INDUSTRIAL

PIG-IRON FOR JAPAN.—The Governments of the Union of South Africa and Japan have signed a contract to supply Japan with 30,000 tons of South African scrap iron which will be loaded on Japanese ships in a few days for shipment to Japan. It is understood that the iron will be used for construction of bridges in Japan.

STEEL AGREEMENT.—Nanking reports that the Ministry of Industry has signed the agreement with German interests for the development of a G.$20,000,000 iron and steel industry in China. It is understood that the Chinese Government is to float bonds to the above amount, the bonds to be held by the German interests as security, and that on the date of signing the German interests will pay from eight hundred thousand to one million gold dollars as deposit money. The Chinese Government will send representatives to Germany to study the iron and steel industry and supervise the purchase of machinery and materials from that country. The management of the iron and steel plants in China will be in Chinese hands, but German experts are to be secured.

ROADS IN SIAM.—Mr. Wirix, a Batavia engineer, was to leave for Siam on May 8 to discuss with the Siamese authorities the possibility of extending the road system in that country and the formation of a British-Dutch concern for the building of roads. If the negotiations are successful Mr. Wirix will discuss the details of the new concern in London.—*Eastern Engineering and Commerce.*

AVIATION

CHINESE AIRWAYS.—In order to avoid competition with the China National Aviation Corporation, the Eurasia Aviation Corporation has reached an understanding with the former regarding the proposed Hankow-Canton Airway. A spokesman of the Eurasia Aviation Corporation states that the proposed route from Canton to Hankow *via* Hunan will be abandoned in favor of a coastal route from Canton *via* Swatow, Foochow, Ningpo, and Hangchow to Shanghai. At Shanghai, the Canton air line will connect with the Shanghai-Hankow service now being run by the China National Aviation Corporation.

VLADIVOSTOK AIR LINE.—A giant airplane belonging to the Soviet Department of Civil Aviation will shortly make its maiden trip from Moscow to Berlin and will then be operated on the new line between Moscow and Vladivostok, which is to start before long, considerably shortening the time for communication between Europe and the Far East. The new machine is the largest land plane in Europe. It can seat 40 passengers and carry a useful load of 6,600 kilograms. Its average speed is 120 miles per hour. It is provided with a powerful wireless transmitter. Several other planes of the same type, it is understood, are already under construction to guarantee a regular express service on this new and internationally important route.

SULZER BROTHERS

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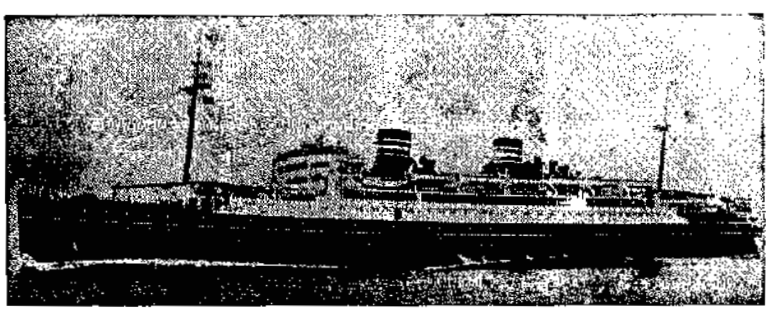

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"THE DANGEROUS MR. STIMSON"

A PLEA FOR MANCHUKUO

WHAT WILL SAVE THE YEN?

Vol. XXVIII | SEPTEMBER, 1932 | No. 9

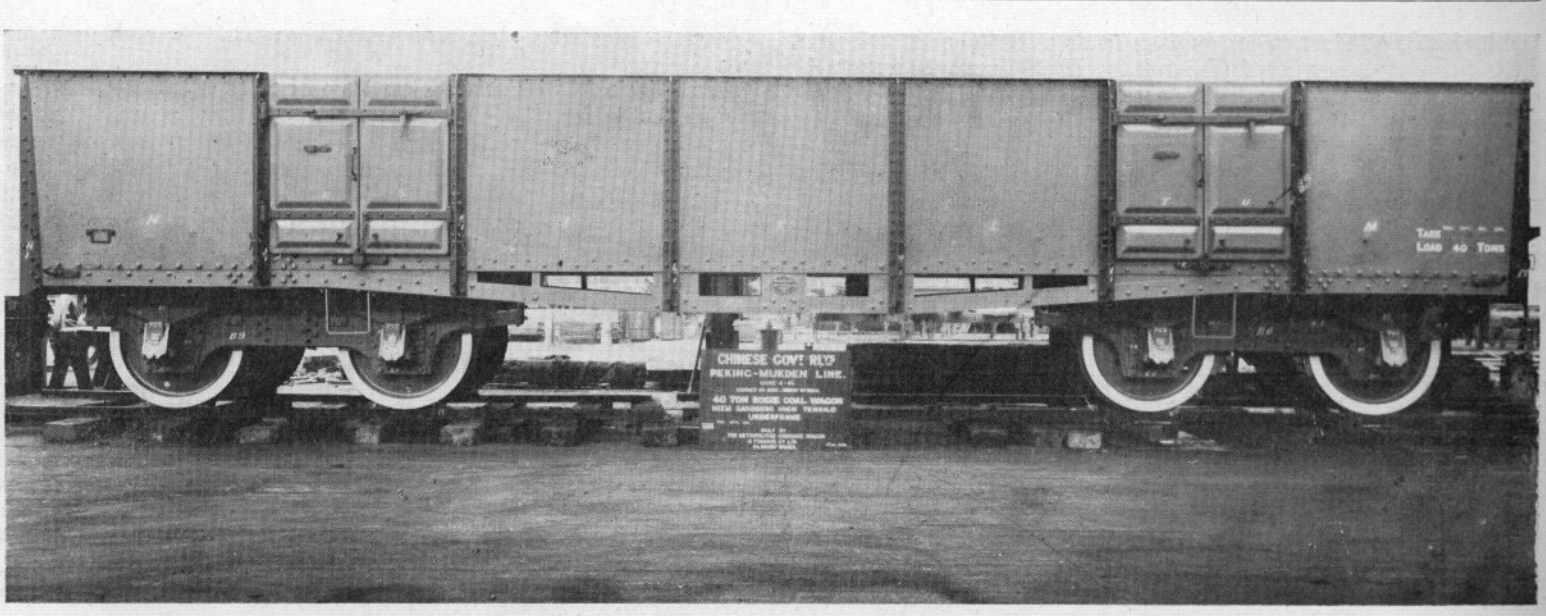

Fig. 1.—40 ton Sandberg High-Tensile Steel Coal Wagon, Bogie Type, built for the Peiping-Liaoning Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

The Metropolitan-Cammell Carriage, Wagon & Finance Company, Limited

Illustrating Many Types of Rolling Stock Supplied by this Company to Railways in China through a Period of 40 Years

(The following article is supplementary to a preceding article devoted to activities in China of the Metropolitan-Cammell Carriage, Wagon & Finance Company, Ltd., which appeared in the June issue of The Far Eastern Review.)

THE Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd. has built rolling stock, bridgework and equipment for the Chinese railways through the whole period of railway development in China and has at the present moment just completed 70 all-steel bogie covered goods wagons of 40,000 kilos capacity and six spans of bridgework for the Chinese National Railways. Accompanying this article are illustrations of some of the rolling stock supplied by the Company to the Chinese Railways.

Wagons—Peiping-Liaoning Railway

The first rolling stock supplied to this railway formed the first main line stock imported into China and consisted of small four-wheeled wagons, which were put into service when the first section of the railway was completed. Since then the Metropolitan-Cammell Company has supplied a very large quantity of rolling stock to this railway and in Fig. 1 is illustrated the latest type of 40 ton bogie

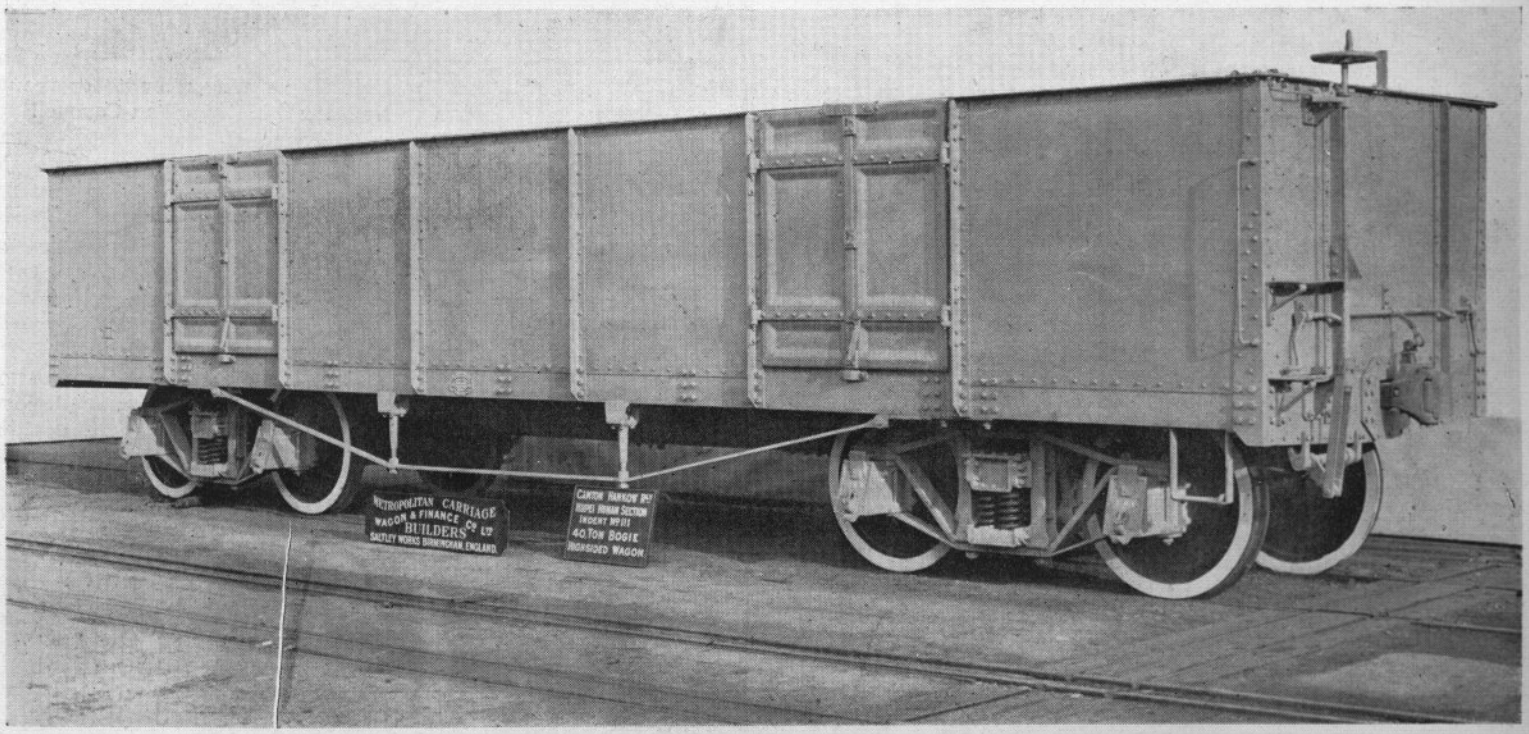

Fig. 3.—40 ton All-Steel High-Side Bogie Wagon built for the Canton-Hankow Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

type high-side all-steel wagon built for this line. The underframe of the wagon is constructed of Sandberg High-Tensile Steel which combines great strength with lightness.

The tare weight of this 40 ton wagon (forty long tons) is only 17 tons.

In Fig. 2 is illustrated one of the bogies of this wagon. The bogie frames consist of pressed steel plates and the wheels are of the rolled steel disc type manufactured by Taylor Brothers & Co., one of the Associated Companies.

The Company has also supplied many wagons of the covered and other types to this railway.

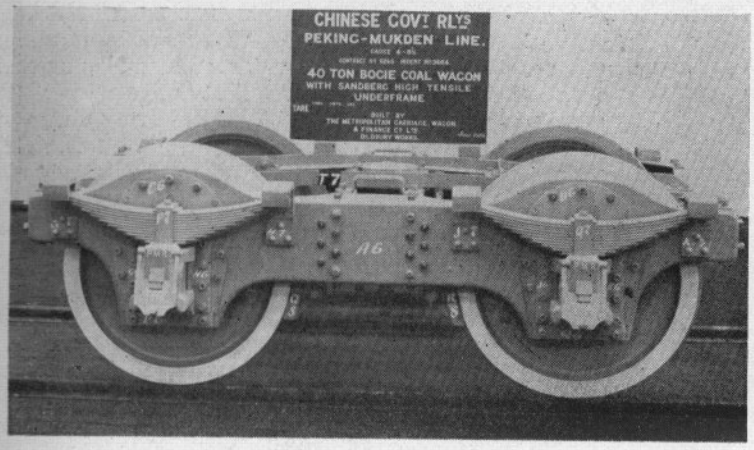

Fig. 2.—All-Steel Bogie Truck for 40 ton Steel Wagon (Sea Fig. 1) built for the Peiping-Liaoning Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

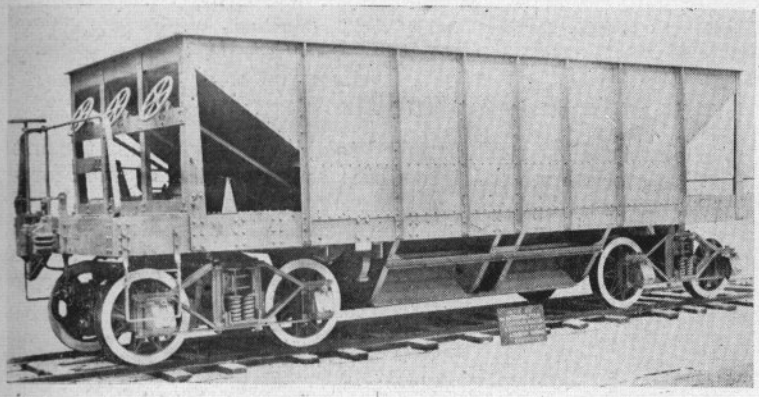

Fig. 4.—All-Steel Bogie Hopper Wagon built for the Nanking-Shanghai Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

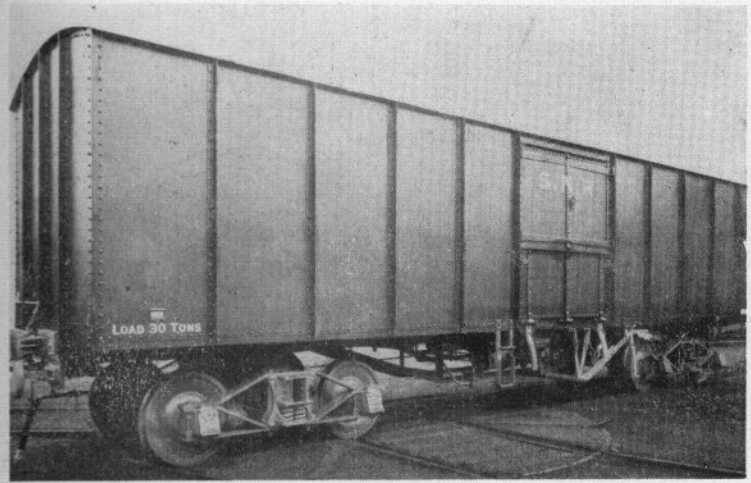

Fig. 6.—30 ton All-Steel Covered Wagon, Bogie Type, built for the Nanking-Shanghai Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

Canton-Hankow Railway

In Figure 3 is illustrated the type of 40 ton all-steel high-side wagons built for the Canton-Hankow Railway, Hupeh-Hunan Section. Nearly 100 of these wagons were built by the Company. Particular points of interest in these wagons are the fish-belly types of steel underframe, vertical adjustment to the truss-rod struts, door opening and closing gear which can be operated from track level when wagon is standing in a siding, journal box dust shields which can be replaced or relined without lifting the wagon, and all parts interchangeable.

Nanking-Shanghai Railway

In Fig. 4 is illustrated a large all-steel hopper-wagon built for ballasting work on the Nanking-Shanghai Railway, all hopper door regulating gear being concentrated at one end of the wagon for convenience.

Figure 5 represents some all-steel low-side wagons of 35 tons capacity built by the Company for this railway. The tare weight of these wagons is 14¼ tons. These particular wagons were supplied with "cast" wheels which were made at the Barrow-in-Furness Works in England.

Figure 6 shows one of many 30 ton all-steel bogie covered wagons built by the Company for the Nanking-Shanghai Railway. The tare weight being 16 tons, 18½ cwt.

In Fig. 7 is illustrated a type of 20 ton all-steel covered wagon mounted on four wheels, many of which have been built for this railway by the Company. The tare weight of this covered wagon is 9 tons, 13 cwt.

In Fig. 8 is shown a Nanking-Shanghai Railway all-steel bogie brake van of high capacity. The tare weight is 19 tons, 11 cwt. These brake vans are very stoutly constructed for heavy service on goods trains.

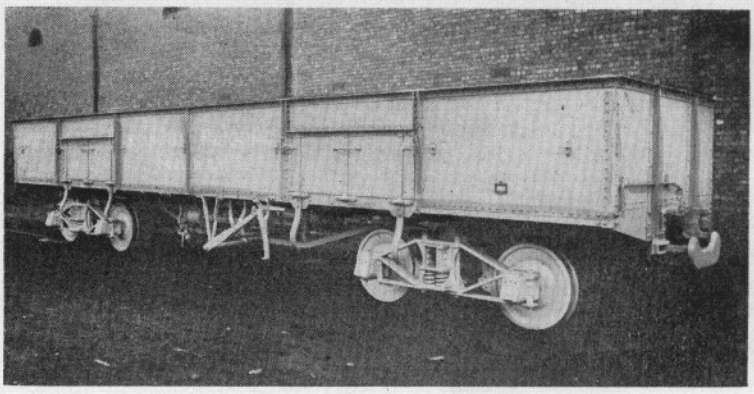

Fig. 5.—35 ton All-Steel Low-side Bogie Wagon built for the Nanking-Shanghai Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co.

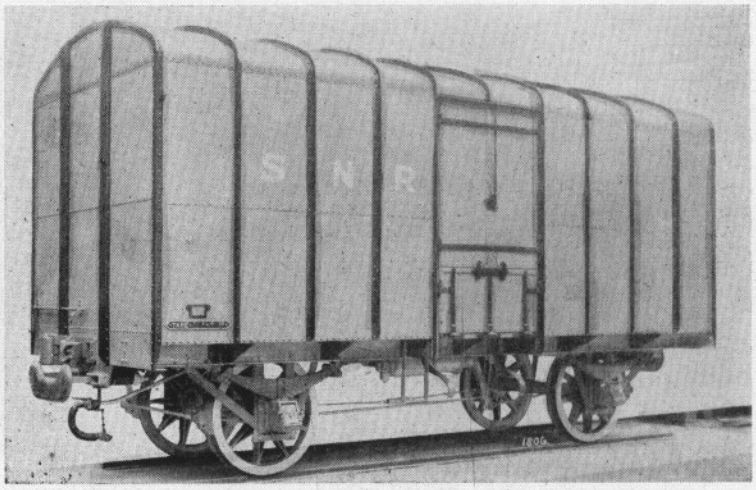

Fig. 7.—21 ton All-Steel Covered Four-Wheeled Wagon built for the Nanking-Shanghai Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co.

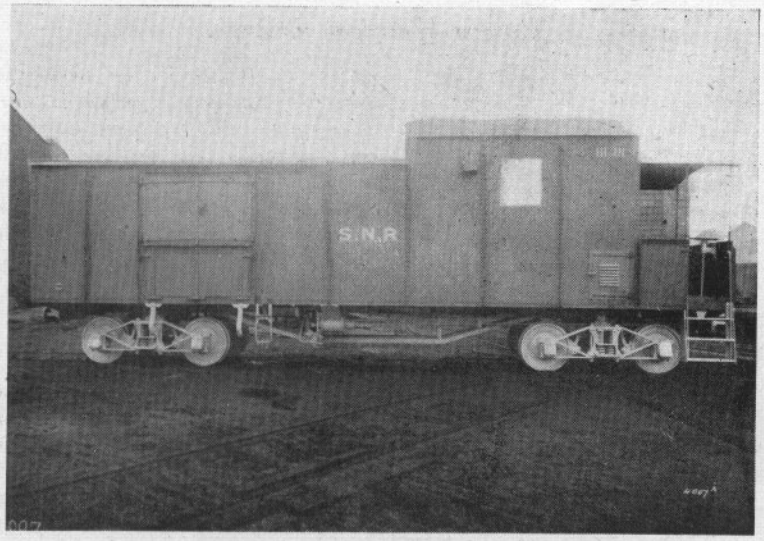

Fig. 8.—All-Steel Bogie Type Brake Van built for the Nanking-Shanghai Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

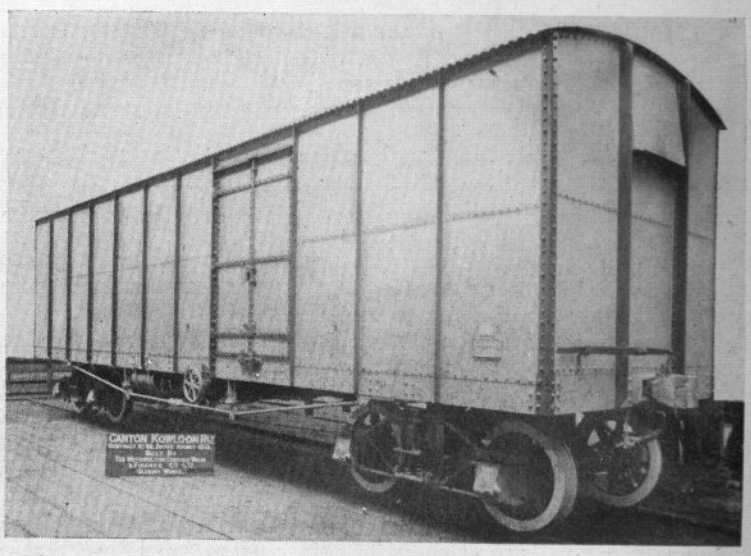

Fig. 9.—All-Steel Bogie Type Covered Wagon built for the Canton-Kowloon Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

Canton-Kowloon Railway

Illustrated in Fig. 9 is the latest type of all-steel bogie type covered goods wagon built by the Company for this railway. Much of the rolling stock on this railway, as also practically the whole of the rolling stock on the Kowloon-Canton line, has been built by the Metropolitan-Cammell Carriage, Wagon & Finance Co.

Shanghai-Hangchow-Ningpo Railway

Fig. 10 represents the latest type of 40 ton all-steel bogie type covered wagon built by the Metropolitan-Cammell Co. for the above railway.

Canton-Hankow-Szechuen Railway

The Company has also built wagons for many of the other railways in China. In Fig. 11 is shown one of a large number of four-wheeled all-steel ballast wagons built for the I-Kuei Section of the Canton-Hankow-Szechuen Railway.

Anhui Railway

A type of 30 ton all-steel bogie type covered goods wagon built for this railway is illustrated in Fig. 12. The tare weight of the 30 ton covered wagon is 12 tons, 18 cwt.

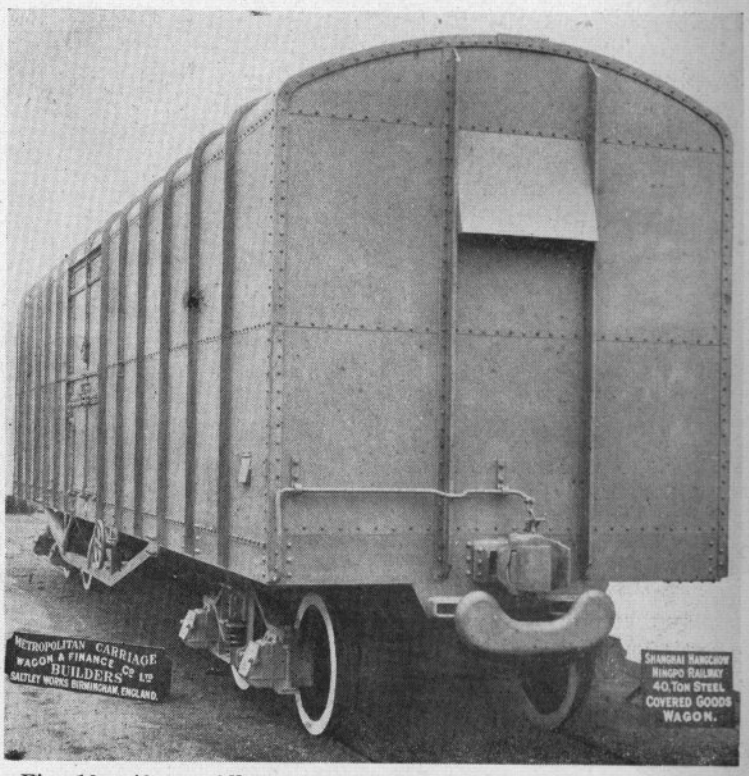

Fig. 10.—40 ton All-Steel Bogie Type Covered Wagon built for the Shanghai-Hangchow-Ningpo Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

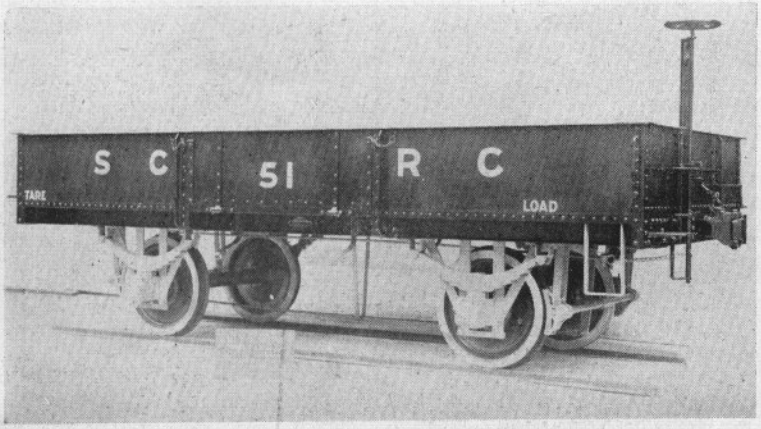

Fig. 11.—Four-wheeled All-Steel Ballast Wagon built for the Canton-Hankow-Szechuen Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

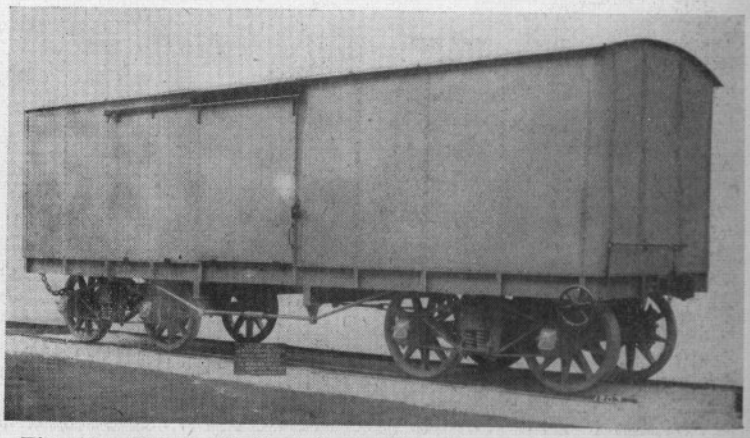

Fig. 12.—30 ton All-Steel Bogie Type Covered Wagon built for the Anhui Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

Coaches

Besides wagon construction the Company has built a very large number of coaches, coach underframes, etc., for the Chinese National Railways. In Figure 13 is illustrated the interior of a coach body built by the Company for the Nanking-Shanghai Railway. This illustrates the high-class workmanship employed by the Company and represents the interior of a first class coach. These coaches have a tare weight of 40 tons, 8½ cwt.

In Figure 14 is shown one of a number of coach underframes built for the Tientsin-Pukow Railway for 60 feet coaches. The tare weight of these underframes and bogies is 17 tons, 8 cwt.

Figure 15 shows a type of Standard underframe built for the Shanghai-Hangchow-Ningpo Railway. All of the coach underframes on this railway have been built by the Metropolitan-Cammell Company. These coach underframes as also those supplied to the Nanking-Shanghai Railway are noted for their very smooth and easy riding and in Fig. 15 is illustrated one of these coach bogies which shows the method of "springing" employed.

The foregoing illustrations will serve to show the many types of rolling stock built for the various lines comprising the Chinese National Railways by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd. The privilege of building stock for these railways has extended over 40 years.

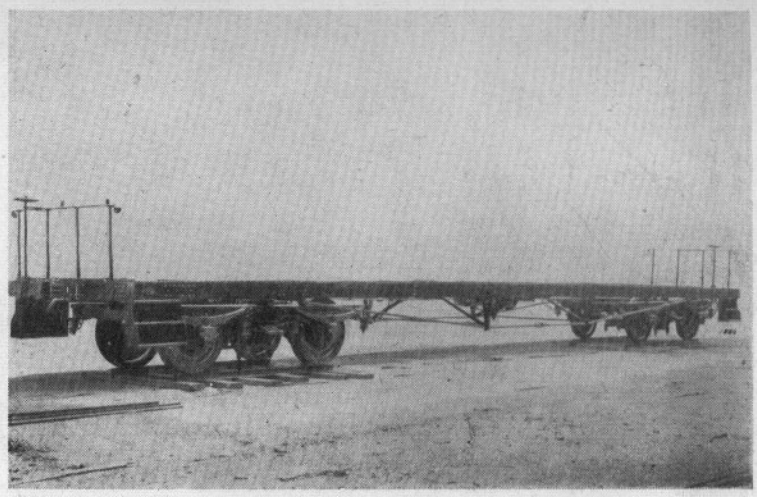

Fig. 14.—Steel Coach Underframe and Bogie Trucks built for the Tientsin-Pukow Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

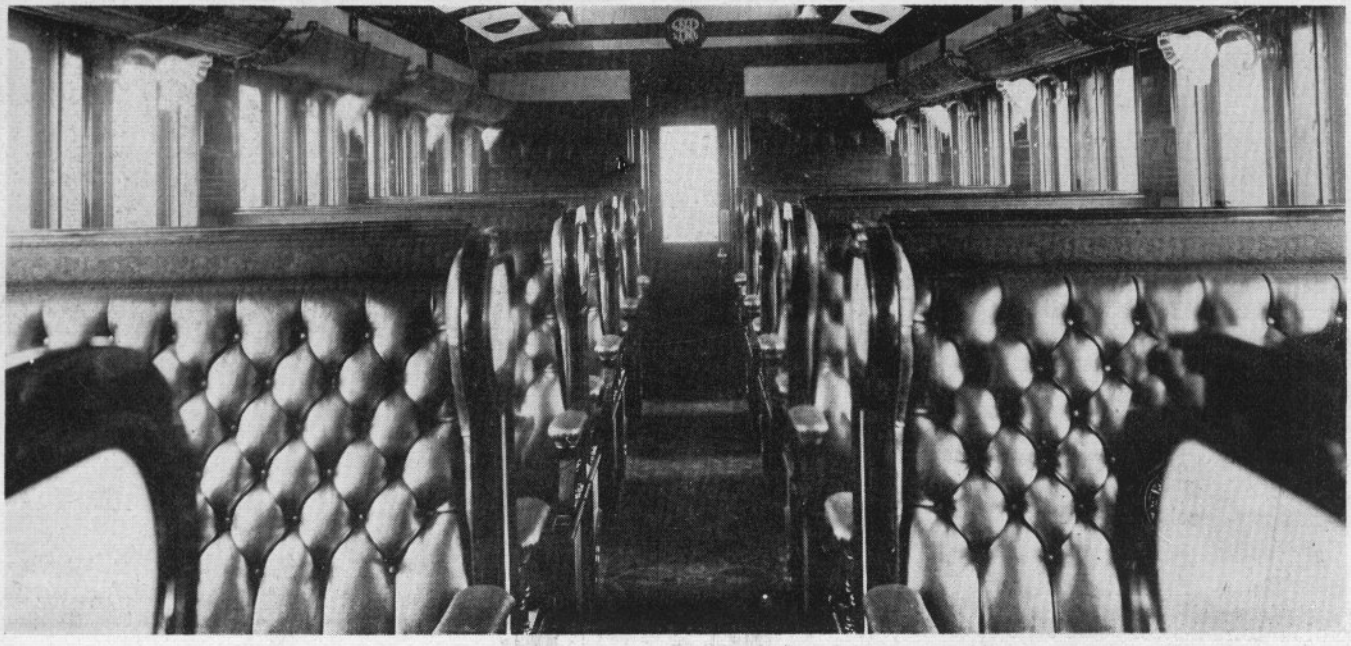

Fig. 13.—Interior First Class Compartment of Coach-Body, Nanking-Shanghai Railway, built by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

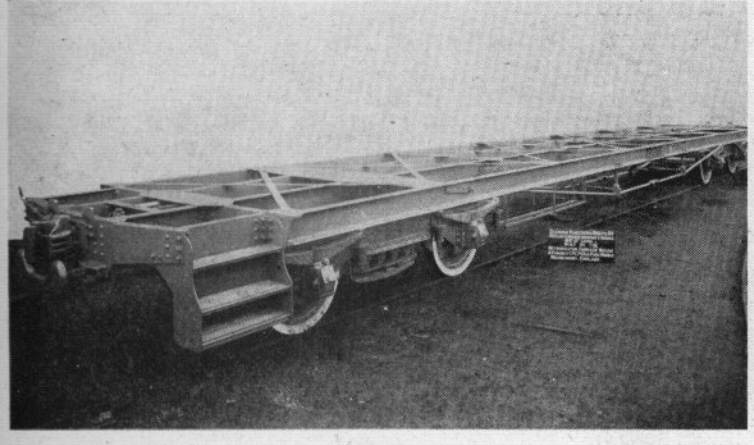

Fig. 15.—Steel Coach Underframe and Bogie Trucks built for the Shanghai-Hangchow-Ningpo Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

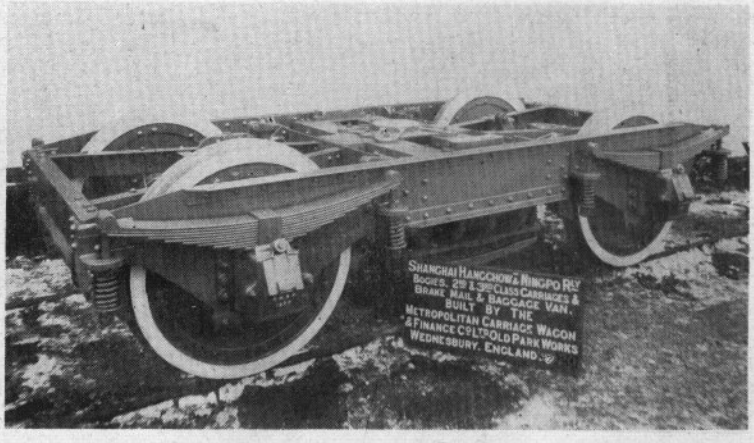
SHANGHAI HANGCHOW & NINGPO RLY
BOGIES FOR 1ST & 3RD CLASS CARRIAGES &
BRAKE MAIL & BAGGAGE VANS
BUILT BY THE
METROPOLITAN CARRIAGE WAGON
& FINANCE CO LTD OLD PARK WORKS
WEDNESBURY ENGLAND

Fig. 16.—Coach Bogie Truck showing Spring-Gear built for the Shanghai-Hangchow-Ningpo Railway by the Metropolitan-Cammell Carriage, Wagon & Finance Co., Ltd.

Engineering Notes

INDUSTRIAL

RAIL SPIKES FOR CHINA.—Among large quantities of British goods now on their way to China—for buying on behalf of this market has revived noticeably during the last month or two—is a consignment of 500 tons of railway screw spikes manufactured to the order of the Chinese Government by Messrs. Charles Richards and Sons, Ltd., at their works in Darlaston, South Staffordshire. As can be imagined, the contract was only secured in the face of the keenest competition, and it is a tribute to the firm in question not only that they were able to obtain the business in the teeth of the fiercest rivalry, but that they were able to execute the order well within the specified time of five weeks. The screws are approximately five inches long, with square heads; roughly 600 tons of steel bars, 100 per cent British, were used in the operation of forging and rolling the screws; and the completed goods were packed in 5,760 cases for conveyance to China. Although among the largest private individual bolt and nut firms in existence and well accustomed to handling large orders for the railways of Great Britain, South Africa and many other countries, Messrs. Charles Richards and Sons, Ltd., may well feel gratified at their latest achievement. —*British Export Guide*.

CHEMICAL INDUSTRY.—With regard to the proposed establishment of an ammonium-sulphate works by the Chinese Government, it is learnt that this will be established in the interior for strategic reasons. Experts are now in Hunan Province selecting a suitable site in proximity to sulphur mines. The works will be capitalized at $3,000,000, and British and German interests will supply the necessary technical assistance. The Chinese Ministry of Industry will shortly establish at Shanghai a branch of the Central Industrial Research Laboratory. The development of sulphur mines in Hunan, Honan, and Shansi is being considered by the Ministry of Industry. Mineralogists will shortly be sent to the three provinces for prospecting purposes, and plans are being drafted by the Ministry for the operation of mines on a commercial basis.—*Chemical Trade Journal*.

RAILWAYS

LIGHT RAILWAY IN CHEKIANG.—Construction of a light railway in China linking Wuhu, the main port of Anhwei, with Chapu, the proposed site of the Great Eastern Port on the Chekiang coast, is sponsored by Messrs. Li Shih-tseng and Chang Ching-kiang, members of the Central Supervisory Committee. It is understood that approval of the Ministry of Railways has already been obtained. This railway, which will be approximately 160 miles in length, will be built as a private enterprise, and will be a narrow-gauge line, designed to serve the needs of the districts traversed. Mr. Chang Ching-kiang, who is also Chairman of the National Reconstruction Commission, is particularly interested in such constructive enterprises, and it was under his administration as Chairman of the Chekiang Provincial Government that the provincial Hangchow-Kiangshan Railway was built.

AVIATION

NEW GERMAN AIRPLANES.—Two new Junker machines of the latest type, model M33, recently arrived in China from Germany and were delivered to the consignees, the Eurasia Aviation Corporation. These machines were ordered several months ago for service on the Nanking-Sinkiang airway.

LINE TO EUROPE.—The Chinese Government is arranging to inaugurate the Eurasia air mail service to Europe as soon as possible in order to overcome the inconvenience caused by the postal embargo declared against Manchuria. The embargo prevents the despatch of mail to Europe *via* Siberia and the Government seeks to overcome this by air mail. Plans are now under discussion between the Ministries of Foreign Affairs and Communications.

COMMUNICATIONS

HIGHWAYS IN CHINA.—Plans for the construction of a network of highways in the three provinces of Kiangsi, Hupeh, and Hunan, recently submitted to the Executive Yuan by the Ministry of Railways, have been referred to the Political Affairs Department of the Yuan for examination.

TELEPHONES IN CHEKIANG.—Since the establishment of the Chekiang Provincial Telephone Bureau in 1928, a total of over 6,000 meters of telephone lines have been installed in the province. In order to meet the still pressing need, the Bureau has decided to instal 17 long-distance lines, totalling 1,454 *li* in length, and 11 other lines for frontier defence, totalling 765 *li* in length.

SHANGHAI-HANGCHOW ROAD.—The Shanghai-Hangchow Inter-Provincial Highway is reported to be near completion. Work on the last section between Nanchiao and Chapoo is now being hastened so that the Highway may be opened for traffic in September.

LONG DISTANCE 'PHONE.—Installation of a long-distance telephone line between Pukow and Tsinan for the Tientsin-Pukow Railway has been ordered. Owing to the absence of this important means of communication railway service on the Pukow-Tsinan section has frequently been delayed. The Telegraph Section of the Railway Administration is to undertake the construction of the line.

SULZER BROTHERS

SHANGHAI ENGINEERING OFFICE

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ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW

In this Number—

CAN WE TRUST JAPAN?

By FRANKLIN D. ROOSEVELT

"THAT LYTTON REPORT"

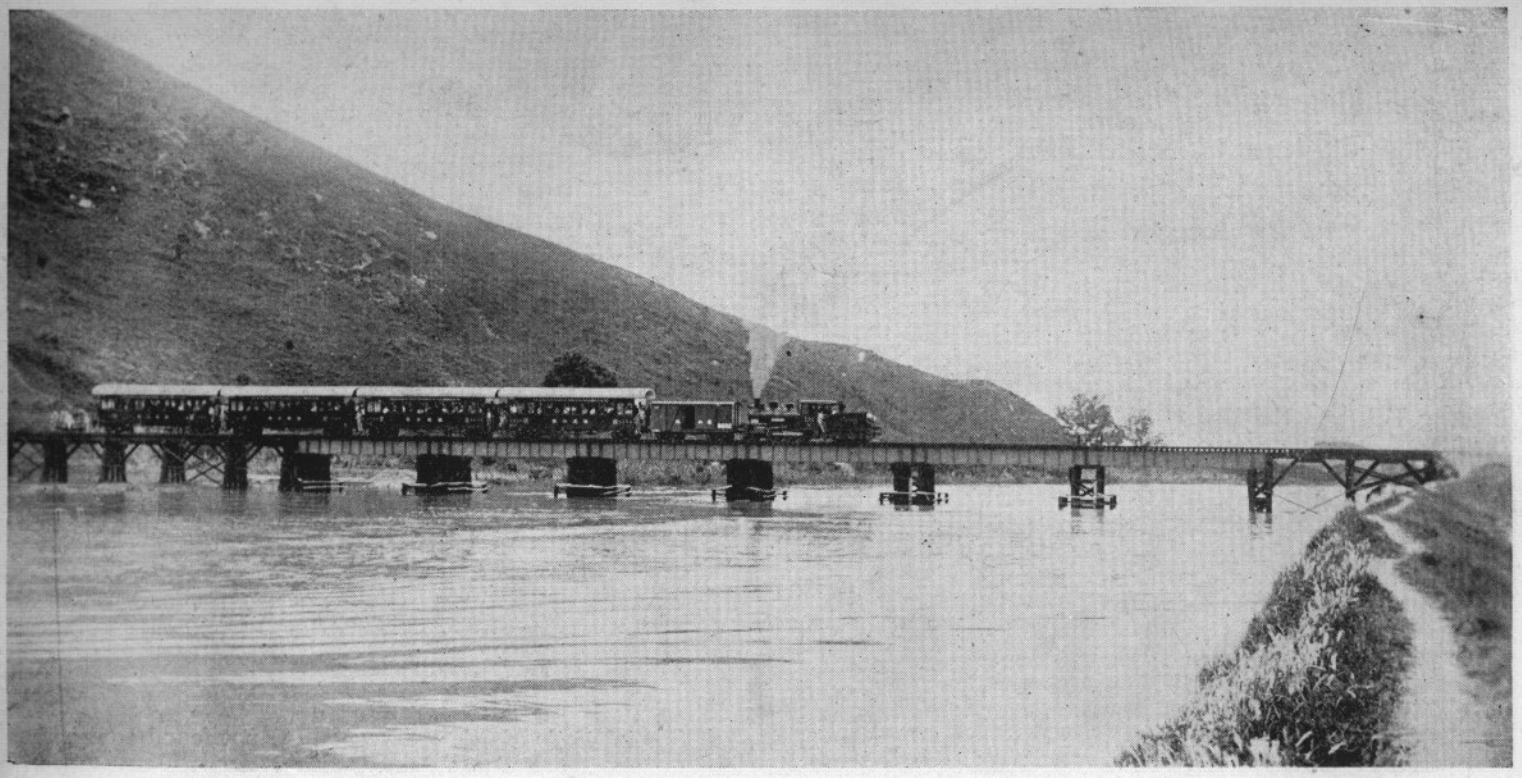
WASHINGTON, GENEVA AND THE FAR EAST

AN EXPERT'S OPINION

上海黃浦灘念四號

遠東時報

Vol. XXVIII | OCTOBER, 1932 | No. 10



The crossing of the Pu Yang River at Chien Shan—This is the longest bridge on the railway. Steel plate girders on cluster pile piers

The Hangchow-Kiangshan Railway*

By ARTHUR M. SHAW, Consulting Engineer

On the sixth of March, of the present year, commercial service was extended to cover the entire length of the first division of the Hangchow-Kiangshan railway, the first regular train entering Lanchi on that date. Service over a portion of the line had been started on the first of June of the previous year, and this was gradually extended, following closely behind track laying.

As this is a pioneer enterprise, vitally affecting the social and economic life of one of the richest, and most populous sections of the country, there has been a widespread interest in its success. Several brief articles have been published, describing certain features, but as an answer to the many inquiries which still are being made, the following more or less detailed description of the physical characteristics of the line has been prepared, together with a brief discussion of future plans, mention of the resources of the areas traversed and other salient features.

Starting at Kiang Pien, which is on the south bank of the Chien Tang Kiang, opposite Hangchow, the railway runs in a generally south-westerly direction through the following towns and cities:

STATION LIST AND KILOMETRAGE

Kilom from Kiang Pien	*Name of Station*
0	Kiang Pien
8	Siao Shan
17	Pai Lu Tang
23	Lin Pu
31	Chien Shan
40	Mei Chih
50	Chih Pu
57	Pai Men
65	Chuki
83	Pai Tou
90	An Hwa
98	Cheng Chia Wu
110	Suchi
122	I Wu
137	I Ting
151	Hsiao Shun
163	Tang Ya
178	Kin Hwa
187	Chu Ma Kwan
200	Lan Chi

The operations to date are proving to be most satisfactory and one feature has been especially gratifying to those interested in the success of the enterprise. This is the rapid development of the freight business. From past history of the new railway project in China. it was expected that passenger revenues would increase rapidly, but it was thought that it would require several years to develop a satisfactory freight business. This undoubtedly will be the case but the increase in freight offered has been much greater than was anticipated. In fact, the demand has reached such a point that an additional order already has been placed for goods cars and it is expected that these will be in service late in the present season. Until these are available it will be impossible to handle all of the business of this class now being offered.

The volume and character of traffic does not demand full, standard ballasting but a moderate force continuously is engaged in supplying ballast during operation and the roadbed has now reached a condition which permits higher speeds. It is anticipated that a new schedule will go into effect shortly reducing considerably the running time of the more important trains. The total cost of the completed line with equipment is slightly in excess of seven million dollars.

Type of Construction

In the matter of gradients and curves (items which most vitally affect the cost of operating trains), the line has been built in conformity with the standards of the Ministry of Railways for the construction of Chinese Government Railways and the track and all equipment are of standard gauge (4-ft. 8½-in.). A

**Chinese Economic Journal.*

substantial reduction was made, however, in weight of rail, width of roadbed and other features, the standards for these being dictated by the existing stringent financial limitations. While it was necessary to practice the strictest economy, the location of the line and design of all details were carried through with the idea that a later revision to heavier standards would be necessary. So far as practicable, provision for this heavier service was made in the original construction of permanent works.

In the alluvial areas, which extend for about 70 kilometers from the Chien Tang Kiang, wooden trestles were quite generally employed for the major stream crossings, with stone culverts for the smaller streams. Each opening was made a matter of separate study and if found that it could be built as a permanent structure, at a cost not greatly exceeding that of a timber bridge, the permanent type was adopted. As relative cost was governed, to a considerable extent, by location (and cost of transportation of materials) this policy resulted in a most varied assortment of waterway structures, ranging from purely wooden trestles, through small stone culverts, large-diameter concrete pipes (often a series of as many as four), concrete arches up to 16-ft. span, stone abutments with steel girders, and in several instances, masonry piers and abutments, designed for steel girders but crossed temporarily by the use of wooden stringers.

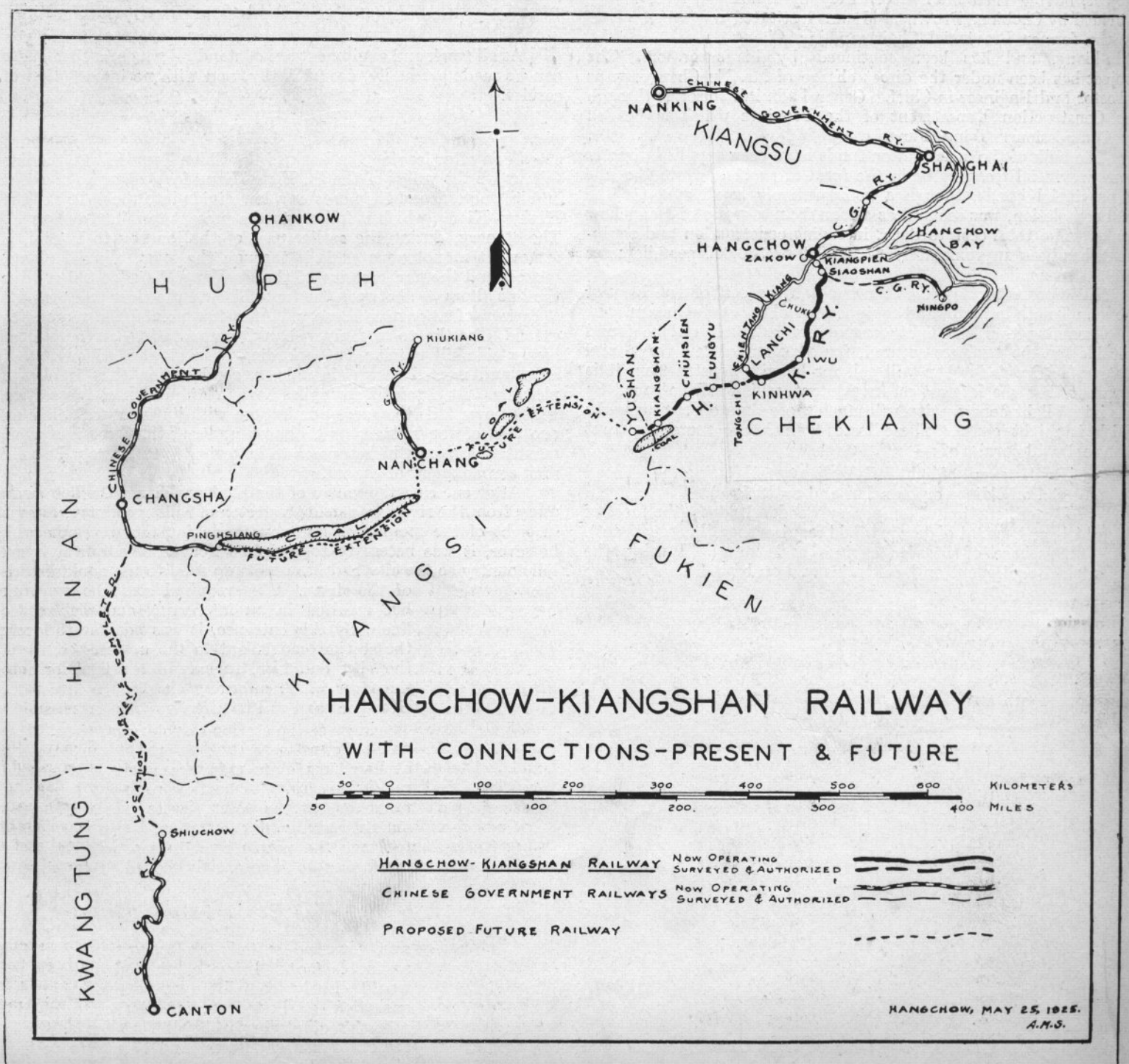
Bridge piers, culverts and similar permanent structures are of a design which renders them suitable for later use under much heavier loading.

Rolling Stock

The locomotives and cars secured for initial operation were selected to suit the estimated requirements of the first few years of operation. While these all are necessarily of limited weight and capacity, as dictated by the light track standards, the details of all units conform to the best modern practice. Air brakes and automatic couplers are used throughout, passenger trains are lighted by electricity, and various devices have been installed which the better railways have found to contribute to efficient service, the comfort of passengers and the safety of employees.

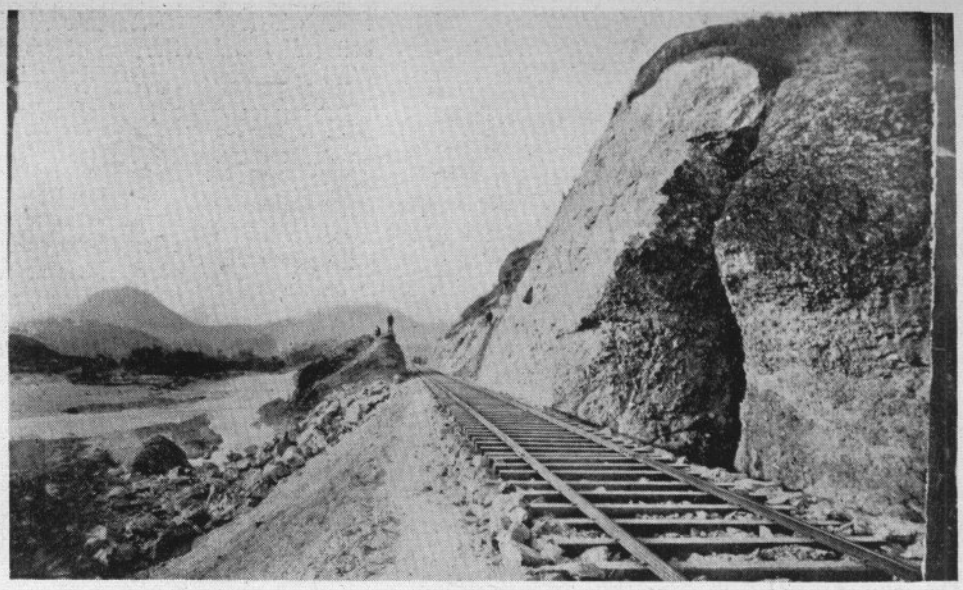
List of Rolling Stock

6 Locomotives, semi-express type, 2-6-0 wheels, 54 tons each.
3 Locomotives, semi-express type, 2-6-0 wheels, 32 tons each.



30 Passenger cars, capacity 50 passengers each.
20 Open cars, without sides, mainly for construction, 15 tons capacity.
16 Open cars, with sides, 15 tons capacity.
4 Closed goods cars, 15 tons capacity.

Trains equivalent to three round trips over the full length of the division are operated daily. Owing to the heavy demand for passenger service, as compared with the moderate freight traffic, all trains are operated as passenger trains, though facilities are provided for handling such freight as is offered. It is probable that as soon as grain movement starts, following the first harvest of the season, it will be necessary to add an exclusively freight train.



Hangchow-Kiangshan Railway.—Skirting close to the Pu Yang River, near Chu Ki.

Financing and Cost

While formally approved by the National Government, this railway is purely a Provincial project, having been financed entirely by funds provided by Chekiang Province. It was instituted by the former Provincial Chairman, Mr. Chang Chin-kiang, and has been continued by his successors. The project has been under the direct charge of Mr. Tu Chen-yuen as Director and Engineer-in-Chief. General administration is through the Construction Department of the Province which is headed by Commissioner Tsing Yung-fu.

The bulk of the construction funds have been supplied directly from provincial treasury or in the form of proceeds from the sale of provincial bonds, though a comparatively small sum for the final completion, was secured as a loan from a group of Hangchow banks. The total cost to date, including construction and equipment, has been approximately $7,200,000 or $36,000 per kilometer ($58,000 per mile).

This is considerably less than one half the cost of a railway of the same length but built and equipped to full heavy-duty standards.

Assuming that the light construction adopted will be found suitable for the business secured, for a period of ten years, and that traffic demands then will call for heavier construction, it is apparent that the interest on investment, which will be saved by this initial light construction will much more than offset any losses which it might cause. These losses (which are more apparent than real) will consist of :—

Replacement of light rails by heavy rails (using the relieved material on sidings or branches and extensions).

Reconstruction of temporary wooden bridges (the most of which, on account of decay, would require renewal in any event).

Purchase of heavier engines and cars (still using the original equipment on local trains and on branch lines).

As all track and equipment are of standard gauge, such changes can be made gradually, economically, and with no interruption of service.

Territory Traversed

Soon after leaving the bank of the Chien Tang Kiang, the line follows up the valley of the Pu Yang Kiang for a distance of about 100 kilometers, and then crosses a low divide into the valley of the Kinhwa Kiang, which it follows to the present terminus at Lanchi. The scenery, during the earlier part of the journey to Lanchi, is somewhat monotonous as it is through the level, alluvial plains, but beyond the first crossing of the Pu Yang Kiang at Chien Shan the line alternates between the foot-hills and the river and presents a variety of attractive scenery. At a few points, the mountains extend directly to the river bank, necessitating an occasional heavy side-hill cutting but affording a most attractive view of river and rugged mountain side, a combination that is always pleasing. At a point a few miles beyond Anhwa, there is a section which never fails to arouse admiration, with its shear rock cliffs on one side of the railway and, almost underneath, there is a swift mountain stream which appears to be trying to tear away the solid rock embankment of the railway.

After entering the valley of the Kinhwa Kiang, the line bears away from the river, traversing a stretch of rolling country, always in sight of the mountains but never reaching them. At Lanchi, however, it was necessary to pass in through some quite rugged hill country as the city had been built up solid to the bank of each of the rivers. This required some heavy work but resulted in an interesting and picturesque line. By this entrance, it was possible to locate the station convenient to the business center of the city and also, to extend the line down to the river bank, affording excellent facilities for river-boat and rail transfer.

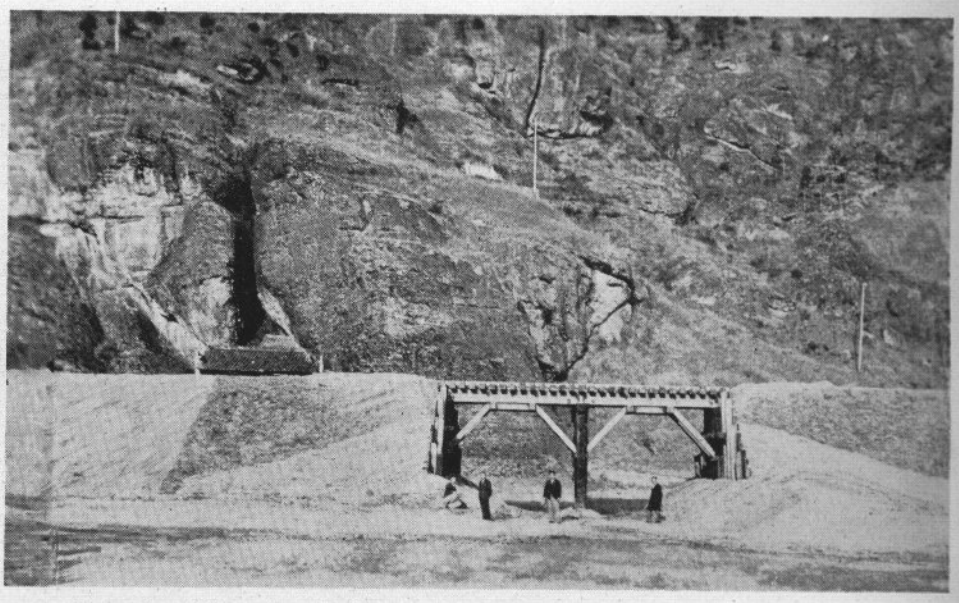
Hangchow-Kiangshan Railway.—A temporary structure which will be re-placed by a concrete culvert

Most of the station structures are of a more or less temporary nature but the station platform at Lanchi is quite unique, in that it is of solid rock, "in situ." A shallow rock cut was to be taken out at the point selected for the station and, in making this excavation, care was exercised to leave the native rock in place to form the platform. It is earnestly hoped, by those in charge, that this one facility may not require removal!

The selection of the route of the railway was governed entirely by economic factors, all avoidable costs being eliminated unless they would clearly contribute toward efficiency of operation or better service. In spite of this necessity of placing utility before the aesthetic, there is much of interest and beauty to be seen along the line, with its river and mountain

scenery, the fertile fields and frequent villages through which the train passes, while the peak of the famous Pei Pan Shan may be seen during several hours of the train ride to Lanchi. Rising three thousand feet above sea-level, this mountain is especially impressive as it rises quite abruptly from the valley floor. On the side of the mountain, at an elevation of 2,500 feet, there are the most ideal spots for summer resorts, with all the natural advantages required for a delightful summer vacation; pure spring water in abundance, varying mountain and valley scenery, paths through the deep woods, quaint villages and an equably cool climate.

This section has been patronized as a summer resort by residents of Kinhwa and Lanchi (from either of which it can be reached by a few hours travel by chair). Those who have spent several summers on the mountain say that they never have seen the thermometer go above 87 degrees (F.) and that it seldom reaches this maximum. The railway officials consider this potential summer resorts one of their valuable assets. It is expected that a motor road will be constructed to the base of the mountain, thus reducing the time required for reaching a suitable resort site to about two hours.



Hangchow-Kiangshan Railway.—A standard type of wooden pile trestle.

Area and Population Served

With the exception of Kiangsu Province, Chekiang is the most densely populated province in the country, while the areas traversed by this line are among the richest and most populous of this province. The *hsiens* which are directly tapped by this line, together with their population, are given as follows :

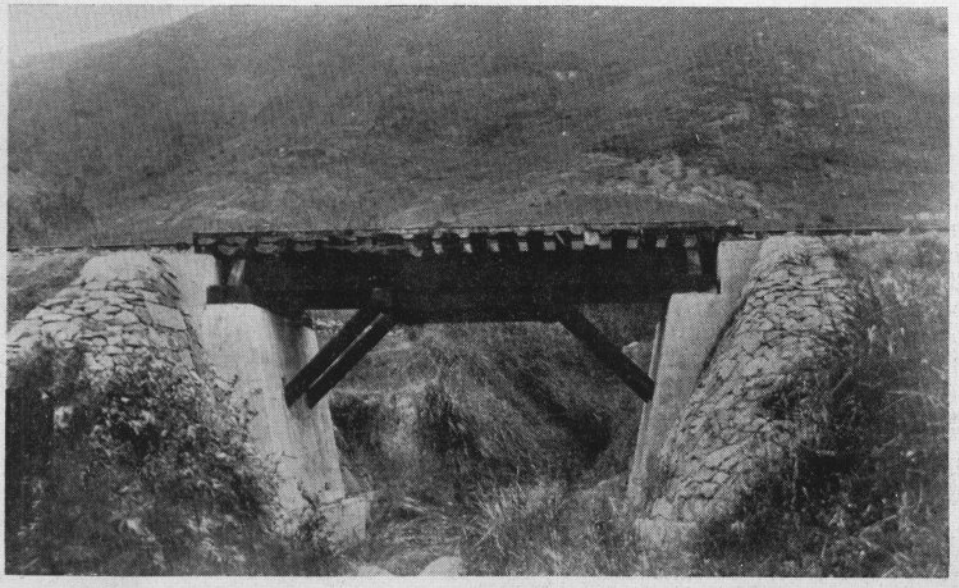
Hsien	*Population*
Hangchow	820,000
Hsiaoshan	523,200
Chuki	529,300
Iwu	294,100
Kinhwa	235,000
Lanchi	267,600
Total;	2,669,200

Hsiens adjoining these which are traversed by the railway, and which have no other adequate means of transportation, will also become tributary to the line. These have a total population of only slightly less than those shown in the foregoing list. Estimating that one half the area and population of these bordering *hsiens* will be tributary, this railway will serve as the main artery of transportation, nearly four million people, not taking into account the service which will be given to people residing beyond the terminus.

Resources of the Territory

The most important single commodity which is produced in the area served is rice, much of which is shipped to the Shanghai and other markets. Miscellaneous farm crops and other cereals are also produced, such as wheat, maize, rape, beans and an infinite variety of vegetables. For several miles up the valley from Lanchi, some of the finest varieties of fruit are grown, the peaches and plums surpassing anything which can now be secured on the Shanghai market. In the past, these have been grown only for local consumption, the surplus being a complete waste but, with quick transportation provided, and the Hangchow and Shanghai markets available, fruit growing should be highly profitable, especially if there can be combined with this, a canning and preserving industry to absorb the surplus and off-season production of both fruits and vegetables. The lower hill-sides, which are unsuited to general farming, are ideal for orchards. While the possibilities have not yet been fully investigated, it seems probable that various other tree fruits, nuts and other crops can also be produced to advantage.

In the vicinity of Iwu are immense deposits of fluorite and other minerals, the exportation of which has been carried on for years though the limited transportation facilities have made it impossible to develop this business on a large scale.



Hangchow-Kiangshan Railway.—A temporary wooden span, resting on concrete abutments which are constructed for a permanent steel girder

The greatest single economic advantage which will follow the advent of a cheap and rapid method of transportation in the area served by the railway will be in the direct and indirect benefits to agriculture. Rail transportation will make possible a more widespread use of commercial fertilizer; it will make possible the marketing of the surplus of production and the importation of commodities which can be produced more economically in other sections; it will reduce the cost of materials now imported; and it will improve social conditions by encouraging outside contacts and by improving mail service.

Completion of the Railway

In the foregoing, reference is made only to that portion of the line which is now in operation, from Hangchow to Lanchi. As soon as the completion of this portion of the line was assured, Director Tu began investigating the possibilities of financing the next section, from Lanchi to Yushan. Some encouragement was received but it was not until the active interest and support of the newly-arrived Commissioner of Construction,

Mr. Tseng Yung-fu, were secured that the finances were placed on a sound basis which would insure the completion of the entire project. As soon as the Commissioner realized the important advantages which would result from the construction of a railway entirely across the Province, he entered into negotiations with his associates in the Provincial Government, with the National Government and with private interests and was able to secure the active support of all.

By the authority of the Provincial Government, over $1,000,000 was made available for railway construction by the sale of the Hangchow electric light plant to private interests.

On the strength of the excellent security which such a property offers, Chinese banks have agreed to loan another $2,500,000, the faith of the bankers, both in the project and in those who direct it, being evidenced by the fact that this new loan is made at a much lower rate of interest than had previously been obtainable.

An additional loan of £200,000 (about $3,600,000) has been secured from the British Boxer Indemnity Fund, through the co-operation of the Ministry of Railways. This sum will be used in the purchase of materials of construction and railway equipment.

With these sums available, it was possible to start construction on the second section early in July. It is estimated that it will require about twenty months for the completion of construction and the start of through train service to Yushan.

The character of the country traversed will be similar to that of the first section, excepting that there will be three rather important stream crossings; and, between Kiangshan and Yushan, it will be necessary to cross the range of mountains which forms the boundary between the two provinces. An exceptionally favorable location for this crossing has been found, however, the final location survey showing a maximum cutting at the summit of less than fifteen meters, with no tunnels or exceptionally heavy work. The cost per kilometer will be slightly greater than that of the first section, due to some increase in the amount of rock cutting, the three bridges mentioned will be required and, especially, all waterways, from the smallest culverts to the largest bridges will be of permanent construction. Including the additional equipment which will be required, the cost of the second division may amount to as much as $40,000 per kilometer.

The character of crops grown in the second section is similar to that of the first, though the proportion of rice becomes less and of other cereals greater.

Between Kiangshan and Yushan, there are considerable areas of somewhat lighter soils, which should be suitable for cotton growing, though so far as is known, cotton culture in this Province has been confined to the coastal regions.

At Yushan, contact is made with the system of navigable rivers of Kiangsi Province, goods from the interior being brought to Yushan by boat, for shipment to eastern markets. Transfer overland to Kiangshan is made by wheelbarrows or to Changshan by wagons and motor trucks. From either of the latter points, freight is sent down the river, on its way to Hangchow, either by bamboo rafts or by small junks (depending on the water stage). At Lanchi, transfer usually is made to larger junks.

With direct rail shipment available from Yushan, the cost of transportation will be greatly reduced while, with proper management, losses by breakage, exposure to the weather and pilfering should become negligible.

In observing the transfer of Kiangsi fine pottery, over the mountain, from Yushan to Changshan, it was noted that the packing was of an especially extensive and expensive nature, apparently exceeding in weight, and certainly exceeding in bulk, the material which it was designed to protect. A method of transportation which would provide direct transfer from boats to cars at Yushan, and no further transfer until Hangchow is reached, would make it possible to save much of this cost of packing and of transportation charges on the packing material. This is just one of the many savings which can be effected by this new railway, if completed through to the head of navigation in Kiangsi Province.

In addition to the extension of the line to Yushan, the plans for completion include a crossing of the Chien Tang River to permit the operation of through trains, in connection with the Shanghai-Hangchow Line. This crossing will be made either by a train ferry, or a bridge, depending on the amount of business in sight and the funds available. There is a suitable location for either type of crossing at a point near the present terminus of the Shanghai line, near Zakou. By providing such a crossing, goods and passengers may be transferred direct from one car to another, or it will be possible to operate through cars if conditions warrant.

It is reasonable to expect that, with such a crossing provided, the completion of the Ningpo line will be undertaken as one of the early projects of the National Government Railways, making some arrangement with the Hangchow-Kiangshan Railway for the joint use of the bridge or ferry.

Purpose of the Railway

The project was conceived, and construction started, by the former Provincial Chairman, Mr. Chang Chin-kiang, mainly for the economic betterment of the Province and to improve the social conditions of the section served. It was also realized that the line would have an important political aspect, affording a ready means for the transportation of troops and supplies and otherwise contributing in national defense measures.

While it is obvious (and even before completion to Lanchi, it was demonstrated) that the railway will serve all these purposes, it is just as obvious that, with the completion to Yushan, the line may become an important source of revenue, and this without imposing a tariff rate at all out of proportion with the service rendered. If the operation of the railway is conducted with the same careful regard for efficiency and economy as were exercised in its construction, it should begin to yield a net profit, over and above operating expenses, almost from the first. The main factors which will contribute toward this will be :—

1. A dense population along the entire route, constituting a business already developed and waiting for the service.
2. An exceptionally rich agricultural section for at least 90% of the distance traversed, from which it will be possible to develop a profitable freight business (though this will come more slowly than the passenger business).
3. Practical freedom from effective competition.
4. Unusually low "fixed charges" in the form of interest on capital investment, due to the low initial cost.
5. Unexcelled opportunity for developing a profitable tourist and passenger business by operating in conjunction with the Chinese Government Railways.

Future Extensions

Owing to their lower first cost and general suitability for short-haul traffic, it is probable that motor roads will be substituted for some of the shorter branch lines which have been suggested, at various times, to serve as feeder lines to the main line of the railway, though it is possible that one or more branch lines, of considerable length and reaching well back into other sections of the Province, will be undertaken later. It is not reasonable to expect that it will be possible to build another line within the Province, which will be so favorably situated as regards economical construction, rapid development of business and other attractive features as have been found for this railway but, with the main line constructed and its future assured, financing of promising branch lines should be made easy, even though the character of country traversed may be somewhat more difficult. An important factor in this further development will be the well-known fact that if other features are favorable, the net earnings of a railway increase at a much higher ratio than its increase in length. Each additional mile that is built not only becomes self-supporting, but it contributes to business of the rest of the system, especially in the "long-haul" business, which is the life blood of any railway. The step-by-step increment of that portion of line now in operation, as service gradually followed track laying, has served as an excellent demonstration of this truth, that revenues per kilometer increase rapidly with the increased length of line. At the same time, unavoidable costs of operation, per kilometer, decrease with the length of the line.

While it is probable that branch line construction, within the Province, will be undertaken by the Provincial Government, following methods which have proven to have been practical, there presumably would be difficulties in extending a provincially owned project through another province. As such an extension into and through Kiangsi Province, will be most desirable, from every point of view, some other method doubtless will be found for the construction of such an extension. Surveys have been made for only a short distance beyond the provincial border but an inspection

of available maps indicates that it will be thoroughly feasible to construct a line in the general location as indicated by the accompanying sketch map. This will run westerly to reach the coal fields in the eastern part of the province, thence south-westerly to the capital of the Province, Nanchang. From this city, the line would follow a south-westerly course, through the immense coal fields of western Kiangsi and connect with the present terminus of the Hankow line at Ping Hsiang. This will give connection with two lines of the Chinese Government Railways, one at Nanchang, with the line running to the Yangtze River at Kiukiang, and the other at Ping Hsiang. This latter point is only about 100 kilometers from Changsha, which is on the main survey line of the Chinese Government project, the Hankow-Canton line. It is generally conceded that the completion of the line to Canton will be one of the first of the important railway construction programs which will be undertaken by the National Government.

Whether such an extension through Kiangsi Province should be undertaken as a joint provincial venture, or as a separate action by each of the two Provinces, or partially by private capital, it should be operated (together with the present line) as a single unit, thus assuring the many advantages which can be secured only by such unit operation. If various agencies are interested in the construction of such a system, separate accounting will be required but this need not interfere with the efficient management and operation of the line as a single unit, with its natural termini at Changsha and Hangchow.

An inspection of the accompanying map will show the important place which such a railway will take in the future transportation system of the country. With its completion, and that of the Hankow-Canton line, an unbroken rail trip can be taken from Canton to Shanghai, or even to Harbin.

The following tabulation will give an approximate idea of the various distances involved, though it has been necessary to estimate some of these distances from insufficient data and hence they may contain a few minor errors.

LENGTH OF EXISTING LINES AND PROPOSED FUTURE EXTENSIONS

From Shanghai to :	*Distances in Kilometers*	*Last Named Section Owner-ship*	*Kilom's in operation*
Hangchow	190	C.G.R.	190
Zakow	195	,,	5
Kiang Pien (opposite Hangchow)	200	H.K.Ry.	—
Kinhwa	378	,,	178
Lanchi	400	,,	22
Yushan	532	,,	—
North-eastern Kiangsi Coal fields	655	—	—
Nanchang	830	—	—
Western Kiangsi Coal fields	880	—	—
Ping Hsiang (present terminus)	1,070	—	—
Chuchow (Jct. point to Canton)	1,160	C.G.R.	90
Changsha	1,176	,,	16
Hankow (Wuchang)	1,595	,,	417
Canton Line.			
Chuchow (Junction point)	1,160	C.G.R.	—
Shiuchow (present terminus from Canton)	1,590	,,	—
Canton	1,810	,,	220

	Kilometers	*Percent*
Total of above lines in operation	1,138	51.6
Surveyed and construction authorized	562	25.3
Suggested—No adequate surveys	511	23.1
Total of railway to reach Hankow and Canton	2,211	100.0

HIGHWAY PROGRESS IN NETHERLAND EAST INDIES

By CARL H. BOEHRINGER, U.S. Assistant Trade Commissioner, Batavia

BUILDING and maintenance of roads in the vast area of Netherland East Indies are of utmost importance to its progress, because of its position as an exporter of agricultural and raw industrial products, principally rubber, sugar, rice, tea, coffee, kapoc, and tapioca, upon which depends its prosperity. The Netherland East Indies have an aggregate area of 735,714 square miles and a population estimated in 1930 at 61,000,000, distributed over a number of widely separated islands. With the exception of certain agricultural centers, the greater portion of this area is yet lacking in economic development, especially on the islands other than Java and Madura.

The Government has always fostered progressive improvement of roads. Even though a number of excellent roads on the various islands already have been built, often across mountainous country, funds and labor are constantly being expended on the steady extension of the highway system.

Governmental aid is considered more necessary now than ever before. As a result of the use of motor transport, both for passengers and for goods, traffic demands or roads in this colony have been gradually increasing.

In 1930 the Netherland East Indies had about 35,900 miles of highways, of which 24,850 were macadam (2,500 miles with bituminous surface), 50 concrete and brick, and 11,050 low-type, earth, sand-clay, or gravel, graded and drained. The road mileages of some of the larger islands are reported as follows: Java, 15,800; Sumatra, 11,400; Borneo, 1,400; Moluccas, Bali, Lombok, and Timor, 3,060.

There were 84,783 motor vehicles registered in Netherland East Indies at the end of 1930. Of these, 63,735 were passenger cars, 6,538 busses, and 14,510 trucks.

The Colonial Public Works Department has general control of road construction, improvements, and maintenance. Much of the work, however, is carried on by the Provinces themselves, which receive funds from the Colonial Government either by a fixed annual contribution or by incidental subsidies. Road expenditures during 1928 amounted to $11,135,000, and during 1929 to $11,548,800. Of these sums the Colonial Government spent $3,834,000 in 1928 and $4,252,000 in 1929; the balance was derived from provincial funds.

Funds for road building and maintenance are drawn from the general revenues of the colony and the Provinces. Each of the islands has its own highway program, the main purpose of which is to connect existing roads and to open up remote regions. Programs for road construction and improvement in the four islands—Java, Sumatra, Borneo, and Celebes—total 85,600,000 florins, with 24,860,000 florins already expended, including colonial and provincial expenditures. Private interests will spend a large sum in addition. (The florin, the unit of currency in Netherland East Indies, equals $0.402 United States currency).

Gravel, sand, and some asphalt suitable for road building are found locally; asphaltic materials and cement are imported, principally from the United States and Japan. During 1930 the imports of these two materials were as follows: Asphalt, 31,257 metric tons (18,257 from the United States); cement, 207,288 metric tons (170,520 from Japan).

As for road-building machinery, only tractors and road rollers are imported in appreciable numbers. In 1930 there were imported 131 units with a total value of about 937,000 florins, of which 112 units were from the United Kingdom. Bitumen boilers are made locally. Exports of road-building machinery from the United States in 1929 and 1930 amounted to $13,093 and $9,439, respectively. During these two years concrete mixers valued at $18,229 were also exported from the United States to Netherland East Indies. Because of the importance and need of good roads, this should eventually be an attractive market for road-buildingm achinery and tractors. With the cheapness of hand labor, however, greatly increased use of mechanical equipment is not to be expected in the near future.

There are about 4,532 miles of railways, of which approximately 70 per cent are in Java. The navigable streams and canals are of great importance as arteries of commerce. There are 11 ocean ports, of which Soerabaya, Tandjong, Priok and Semarang are the most important.

Engineering Notes

INDUSTRIAL

SELANGOR CANNING FACTORY.—The declared policy of all the Governments of Malaya is to find other strings to their industrial and agricultural bows since rubber and tin are no longer magic talismans. The pineapple canning industry holds out great promise, and the first step has been taken. Plans have been prepared for a model estate and canning factory in Selangor, but pending the decision of the F.M.S. Government with regard to the alienation of land for the purpose, work cannot proceed. The scheme has influential official and unofficial backing in Selangor. The combination of a high quality fruit packed by machinery in accordance with the latest methods will enable Malaya to enter a market she has hitherto only aspired to. If the scheme is put into operation it will be the forerunner of many others.

SOVIET METAL INDUSTY.—The second blast furnace of the Kuznetz steel mill started operations on July 16. The first pig iron was poured within 23 hours after the furnace was blown in, as compared with three days for the first blast furnace. The amount of the first pouring totaled 89 tons, double that of blast furnace No. 1. Premiums have been awarded to outstanding workers on the two blast furnaces. Five workers received 1,000 roubles each, while an additional 10,000 roubles were assigned for premiums to other workers. The work of Mr. Ferguson, an American engineer, was particularly commended.

The second Magnitogorsk blast furnace, "Young Communist," broke all its previous records by producing on July 22 a total of 892 metric tons of metal. The furnace worked at a blow of 2,000 cubic meters per minute.

NEW BAGUIO MILL.—The Benguet Exploration Mining Co., owner of the Contact Mine, in Baguio, Philippine Islands, is placing bids for the installation of a 50 ton cyanide leaching plant to treat surface and underground ores. Further installations are planned for the future. Some of the materials already have been purchased, it is understood. The plant will be ready to operate shortly. A large compressor will be installed on the Contact property, and a 3,000-ft. tunnel driven to ascertain the location of one of the main veins. It is explained that this vein is cut off by a large earth fault, and it is necessary to drive through the fault in order to pick up the vein on the other side. An operating plant of 100 to 150 ton capacity is to be installed if and when the vein is picked up. The Benguet Exploration is the first among several new mining ventures in the Benguet district to proceed with installation. All of these new companies have been organized within the last two years.

SHEET PILINGS IN JAPAN.—Just recently large quantities of sheet pilings have been consigned to Japan for harbor works in Osaka, Yokohama and smaller bases for the Japanese fleet on the West coast. These were supplied by German Works, and they were made from a special iron for the purpose containing a certain percentage of copper rendering it perfectly resistant to rust, as has been discovered in actual practice. The new pilings may be employed for the most varied purposes and form an absolutely watertight enclosure. The material is unusually tough and possesses a high tensile strength so that the sheet pilings can be powerfully and rapidly rammed into hard ground without bending. The addition of copper renders the resistance to corrosion in sea water all the greater. Although a similar iron is being produced in Japan, German material was selected because it alone possesses the necessary qualities to render the pilings capable of standing up to such treatment to provide the necessary watertight enclosure.—*Uebersee Post.*

RAILWAYS

TRANSCAUCASIAN RAILWAY—A new railway is to be built across the Caucasian Mountains in the near future, connecting Gori in Georgia with Darg-Kokh in Northern Ossetia. It will lead through a tunnel at Roka and will be the shortest route to the northern slope of the mountains. The cost of the road, preliminary plans for which have already been prepared by a special government commission, is estimated at 100 million roubles.

LOCOMOTIVES TESTED.—The first tests of the electric locomotives on the Suram Pass in Georgia were to be held on July 1. The assembly of the locomotives, which were purchased from the International General Electric Company, was done under the supervision of its engineers. Italian engineers and experts have been engaged to supervise the installations of equipment for the sub-stations for the sections between Stalinsk and Zestafony. On June 27 the first current was furnished for the electrified railway leading through the Suram Pass. A 35,000-volt current was used for testing the contact line.

FERRY LAUNCHED.—The Nanking-Pukow railway ferry *Changkiang*, now under construction in England, will be launched in November and will be dispatched to China under its own steam immediately upon completion of all minor fittings, according to a message received by the Ministry of Railways from its Purchasing Commission in London. The vessel is expected to arrive at Nanking by the end of the year. The ferry will be placed on service across the Yangtze River at Pukow to link up through trains of the Nanking-Shanghai and Tientsin-Pukow Railways.—*Kuo Min.*

LOAN FOR RAILWAY—It is reported that a loan agreement between the Chekiang Provincial Government and a financial syndicate at Shanghai for the completion of the Hangchow-Kiangshan Railway has been drafted and will be brought up before the Provincial Government Committee for confirmation. In order to obtain the necessary funds for the completion of that line, the Provincial Authorities, after protracted negotiations, have agreed to transfer control of the Hangchow, Yushih, Yuhiang, and Szean electric works to the financial syndicate as security. It is understood that Mr. Li Ming, General Manager of the Chekiang Industrial Bank at Shanghai, will, on behalf of the syndicate, proceed to Hangchow shortly to complete the final arrangements.—*Kuo Min.*

COMMUNICATIONS

ROAD APPROPRIATIONS—Appropriations of 551 million roubles ($383,000,000) have recently been approved for road construction in 1932 throughout the R.S.F.S.R. (Russian Republic proper). This is to be spent in connection with the building of 44,110 kilometers (27,500 miles) of improved dirt roads, 5,441 kilometers of hard surface roads and 341,342 meters of bridges.

BONDS IN CHINA—A telegram from Sining, provincial capital of Kokonor (Chinghai), to Nanking reports that the recently completed highways in that province now serve to link up Sining with Lanchow, the Kansu provincial capital, and other distant parts of Kokonor. The Sining-Lanchow Highway now brings Sining to within one day's journey from Lanchow, the distance being slightly over 100 miles. Sining is also connected with Shuhsien, in the western section of the province, by a highway 1,100 miles long, which has rendered it possible to reach the provincial capital by motor-bus in six days.—*Kuo Min.*

SHANGHAI HARBOR MAP—An excellent new map of Shanghai harbor has just been published by the Whangpoo Conservancy Board clearly showing all berthing facilities in the harbor. The map is obtainable from the office of the Engineer-in-Chief of the Whangpoo Conservancy Board at Shanghai at the price of $2.

LAKE DREDGING—Plans are being made by the Hunan Provincial Government for the dredging of the Tungting Lake, in northern Hunan, and its rivers, the Siang Kiang, Tzu Kiang, Yuan Kiang and Li Kiang, in order to remove the flood menace to the province. The lake, which is gradually filling up with silt, now constitutes an impediment to the flow of the waters of these four rivers. As dredging operations on the entire lake itself cannot be undertaken at the present juncture when the Government is facing financial difficulties, it has been decided to concentrate attention on important points both along the rivers and at their outlets to the lake.—*Kuo Min.*

SHIPPING

BANGKOK CANAL.—The Siamese Government, in spite of severe retrenchments, is not losing sight of possibilities for development. A recent *Gazette* gave particulars of a decree declaring a huang ham boundary, namely, an area reserved for a period of five years, which shall be considered to be for the own use of the Government. An explanation accompanying the notification states that the shallow bar at the mouth of the river does not permit the passage of vessels of heavy tonnage, and it is the purpose of the Government to improve communication between the sea and the harbor of Bangkok, to facilitate the trade of the country. It is understood that through the area marked off a ship canal is to be cut that will give passage to vessels of any size. This is a development which would obviously effect a great saving of time and money.

SEEKS SUBSIDY.—It is reported that Japanese shipping interests have asked their Government for a subsidy of Y.20,000,000 to aid the services of foreign routes. It is pointed out that the major financial difficulties faced by Japanese shipping have been the fall in the value of the £ sterling; the inability to increase freight rates without loss of trade and the certain loss in revenue by maintaining old rates; and the diversion of important American and Australian cargoes to vessels other than Japanese under the Chinese boycott. It is stated that the problem was partially met in 1931 by working agreements between the larger shipping Companies, but that this has not sufficed to relieve the acute situation in general, and many charterers have had to cancel contracts. Prohibition of importation of foreign tonnage has also been sought as a partial remedy. —*Fairplay.*

AVIATION

AIRPORTS PLANNED.—The Tokyo Communications Office has decided to build three commercial airports, each with an area of 160,000 tsubo, or slightly more than 130 acres, on the northern stretch of Japan's proposed trunk airway, subject to the approval of the Diet. These airports will be erected at Sendai, Aomori, and Sapporo, for which the Finance Office has consented to appropriate a sum of Y.1,100,000 for the current fiscal year. The Government intends to start construction work immediately upon obtaining the Diet approval. The Communications Office will establish regular passenger and airmail service between Tokyo and Asahikawa, by using the proposed three airports as the connecting links, starting with one round trip each way daily except Sundays.

ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW

DEPARTMENT OF COMMERCE JUN

上海黃浦灘念四號

遠東時報

MANCHURIA AND THE MONROE DOCTRINE CLAUSE OF THE LEAGUE COVENANT

MATSUOKA DISCUSSES MANCHUKUO

AMERICAN STRATEGY IN MANCHURIA

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For internal communications, the first step would be a branch railway from the port to Tangshan on the Peiping and Liaoning Railway. A railway and canal to the Kailan collieries are projected, while there are numerous existing canals in the hinterland, and the Lan River can be improved so as to accommodate light-draught steamers as well as barges. Highway connections would be necessary.

Two principal engineering works would be a pier and a quay, each about 400-ft. wide, composed of solid ground between massive concrete dock walls. There would be 36-ft. of water on both sides of the pier and on one side of the quay, the other side of the latter having a boat canal 100-ft. wide, with 10-ft. of water. On the pier would be two rows of 120-ft. one-storey transit sheds, 100-ft. apart, with railway tracks between them and a track along each water-side of the pier. The quay equipment would be similar, except that a three-storey warehouse or godown would take the place of a transit shed on the canal side, and the only railway line would be a track along the deep-water side of the quay.

Three periods of five years each are proposed for the construction work, with expenditures of approximately £5,000,000 for each period. The first period would cover the execution of the necessary dredging and filling; the construction of the 52 mile railway to Tangshan; a 1,600-ft. length of pier and 3,500-ft. of quay, giving a total of 6,500-ft. of steamer berthing space; the transit sheds and warehouses; and the provision of the necessary pilot boats and tugs; also the laying out of the city and the construction of waterworks and electric light plants. The other periods would cover mainly extensions and enlargements, together with such additional works as dry docks, coaling piers, oil wharves, and municipal structures.

To finance this Government project, it is proposed that port bonds should be issued for £10,000,000 to be expended in ten years. After that period, the Customs revenues and land sales should provide for the final five year period. The report suggests also that in order to distribute the expenditures it might be economical to arrange to provide the necessary funds partly by direct appropriations from the Central Government, partly by internal bonds, and partly by foreign loans. As there are no extensive settlements or works at the proposed site, it is pointed out in Dr. Shu Tien-li's report that the development of the port and the building up of a modern city can be accomplished in an economical way and according to the best planning of engineers and architects.

British Boxer Funds

MR. R. CALDER-MARSHALL, Vice-President of the Board of Trustees for the administration of the Indemnity Funds remitted by the British Government, has given a brief recapitulation of the activities of the Board during the first year of its existence.

Allocations have been approved for the purchase from London funds of £880,000 worth of equipment and material for various railways, of £550,000 for other works, the purchases in the latter case being not yet or only partly made.

From China funds, the chief items are $876,000 for the Canton-Hankow Railway, £40,000 for the Nanking-Pukow Train Ferry, $103,000 for the Ministry of Industries, and £13,336 for the Hwai River Conservancy.

The Board of Trustees was duly constituted on March 28, 1931, and at its first meeting the members of the Purchasing Commission were nominated.

To safeguard the funds of the Trust, each proposal made is submitted to the Board and if generally approvad is passed to the Technical and Finance Sub-Committees for further more detailed investigation, their reports in detail together with form of proposed contract in which provision is made for security required and for interest and amortisation, being submitted to the Board for discussion and final decision, If then approved by the Board contracts are drawn up by the Board's legal adviser and such contracts are again scrutinised by the Finance Sub-Committee prior to signature. Prior to these regulations coming into force certain purchases were made by the Ministries or organizations concerned and in connection with such purchases contracts either have been signed or are being arranged, due provision being made for interest, repayment for amount expended, and security.

The Board of Trustees are working in strict accord with the terms embodied in the Exchange of Notes, that is to say that the Funds in London are being utilized for the purchase of materials in Great Britain for railways and/or other productive enterprises, while the funds paid to the Board of Trustees are loaned to similar enterprises, in both cases arrangements being made which should ensure payment of interest and repayment of the capital amount over a period of years.

As the Board of Trustees is entitled to use only the income derived from the investment of the funds for educational purposes, it is obvious that some little time must elapse before the fund available for education is sufficiently large to allocate.

When the Board of Trustees was constituted the total of the accumulated funds in London amounted to £3,442,131, plus interest, while the amount still receivable up to 1945—£7,744,416, making a total of £11,186,547. Of the £7,744,416, £3,872,208 will be paid to the Purchasing Commission in London for the purchase of materials in Great Britain, while £3,872,208 will be paid to the Board of Trustees in China for investment in China as mentioned above.

In accordance with instructions of the Executive Yuan, the Indemnity Funds are to be allocated as under:—

Railways		2/3rd
Huai River Conservancy	40%	of 1/3rd
Pearl River Conservancy	20%	of 1/3rd
Yellow River Conservancy	13-1/3%	of 1/3rd
Ministry of Industries	13-1/3%	of 1/3rd
National Construction Commission	13-1/3%	of 1/3rd

In every case the funds in London to be used for the purchase of materials for productive enterprises, while the funds in China are to be loaned for purposes of construction, suitable arrangements being made to ensure the payment of interest and repayment of capital.

Up to the present time the undermentioned allocations have been approved:—

RAILWAYS

From London Funds:		
Nanking-Pukow Train Ferry		£160,000*
Kiaouchow-Tsinan Railway		350,000*
Tientsin-Pukow Railway		240,000*
Canton-Hankow Railway:		
Kwan Shao	£ 30,000	
Hunan-Hupeh	110,000	
Chuchow-Shaokwan	30,000	
		£170,000
From China Funds:		
Nanking-Pukow Train Ferry		£ 40,000
Chuchow-Shaokwan		£176,000
Canton-Hankow Railway:		
Shaokwan-Lochang		$700,000

HWAI RIVER CONSERVANCY

From London Funds	£250,000‡
From China Funds	£ 13,336

MINISTRY OF INDUSTRIES

From London Funds	£123,000‡
From China Funds	$103,000

MINISTRY OF COMMUNICATIONS

From London Funds:	
Wireless Communication	£ 50,000‡

NATIONAL CONSTRUCTION COMMISSION

From London Funds:	
Electrical Equipment	£140,000

*On repayment funds to be used for Canton-Hankow Railway.
‡Purchases either not yet made or only partly made.

AUDIT IN HAND

Agreements between the Board and the Ministries or organizations specified either have been or are being made with regard to the above-mentioned appropriations.

The question of accounting has presented some difficulties as it is necessary to combine the London accounts with those in China and consequently, though the financial year ended on June 30, and though it would be possible to prepare the statement of the China accounts without much delay, a certain time must elapse before accounts are received from England, so that a statement showing the position of the Trust as a whole cannot be prepared for some weeks after the end of the financial year. Messrs. Thomson and Co., of Shanghai, were appointed Accountants and Auditors by the Board of Trustees last year.

Engineering Notes

INDUSTRIAL

MINISTRY BUILDING.—The corner-stone for the new building of the Ministry of Foreign Affairs at Nanking will be laid at the end of this year. Plans for the structure have been completed. The cost of construction is estimated at $400,000, which will be appropriated from the British Boxer Indemnity Refund in accordance with arrangements already made.—*Kuo Min.*

MACAO COMMUNICATIONS.—The new Director of Posts at Macao has three jobs in hand. First, he is to complete the extension of the telephone lines, making up the total to two thousand, to satisfy the demands for private houses. The second work is to link Macao with Taipa and Coloane by telephone. The laying of cables will be in charge of the P.W.D., and a new dredger from Germany will work at top speed. The third job is the installation of a broadcasting station. The Director is also thinking of linking Macao with Hongkong and Canton by radio-telephone.

TENDERS WANTED. The Municipality of Singapore has called for tenders, to be presented in Singapore or London by October 20, for the supply of two 1,000 gallons per minute pumps of the vertical spindle centrifugal type, direct driven by electric motors complete with starters and air exhausters for priming. Firms desirous of offering goods of United Kingdom manufacture can obtain the further details of this call for tenders, together with particulars of the Special Register service of information, upon application to the Department of Overseas Trade, 35 Old Queen Street, London, S.W.1. Reference number G.X. 11874 should be quoted.

BRITISH EQUIPMENT.—During the past few years Japanese purchases of British electrical machinery have shown a sharp decline. The total value of Japan's imports of this class in 1927 was £318,000. Last year it had fallen to £25,000; in fact, the imports of some classes, *e.g.*, rotary convertors, ceased altogether. At the same time, it is clear that the trade has not been entirely lost. This is demonstrated by an article on the new Kokura power station. The Metropolitan-Vickers Co. is to be congratulated upon securing the order for the two 25,000 kw. high-speed turbo-alternators for this station, the four new boilers are of Babcock and Wilcox manufacture, and the auxiliaries also include a number of items of British production.

RAILWAYS

JAPAN RAILWAY ELECTRIFICATION.—Tokyo Bluff Rapid Transit Railway Co. is to start work on the construction of the first section of proposed railway between Skibuya and Koyenji at a cost of Y.1,000,000.

CHINESE RAILWAY WORK. The eastern extension of the Lung-Hai Railway from Haichow to Hsukow, on the Kiangsu coast, will be completed by next spring, according to a responsible official of the railway. Side by side with the building of the railway, the work of completing the wharves and godowns as well as the development of the Hsukow harbor itself is being carried on. The cost of the harbor works under construction is estimated at $1,300,000, it is learnt.

A corps of engineers are now conducting surveys on the proposed route of the Shihchiachwang-Taku Railway following the conclusion of arrangements between the Ministry of Railways and French financial interests for a loan of 350 million francs. It is reported here that Mr. Tseng Chung-ming, Vice-Minister of Railways, will be appointed Director of the Engineering Bureau of the new Railway.—*Kuo Min.*

BUYS SLEEPERS.—A shipment of railway material, consisting of 200,000 wooden sleepers, has arrived in Nanking for delivery to the Tientsin-Pukow Railway Administration. The consignment was purchased from America by the Ministry of Railways at a cost of over $400,000.—*Kuo Min.*

BUYING SLEEPERS.—For the reconditioning of the road-bed of the Peiping-Hankow line, the Ministry of Railways has placed an order for 300,000 pieces of sleepers, which will be used to replace those which have deteriorated. The contract price is stated to be $600,000.—*Kuo Min.*

TRAMS FOR NANKING.—Plans for a network of trolly car lines for the main thoroughfares of Nanking are under consideration. The National Reconstruction Commission's preparations are far advanced and the project practically decided upon. Transportation in the capital at present depends chiefly on rickshas, motor-cars and omnibus service. A system of rail-less trams will meet the growing requirements of the population. It is understood that the contract may be awarded to a German company.

CHENGTING-TAIYUAN RAILWAY.—In compliance with orders from the Ministry of Railways, deputies of the Chengting-Taiyuan Railway, accompanied by French engineers, for a survey of the proposed route of the Shihchiachwang-Taku Railway across Hopei province. It is understood that for the present the route will be charted from Shihchiachwang as far as Siaofan, a town midway between the two terminals, 100 miles east of Shihchiachwang. Survey operations for the Tatung-Tungkwan Railway, another projected line in the North-west, will commence as soon as survey work on the Shihchiachwang-Taku Line is completed. It is reported that funds for the construction of these two railways has been secured by a loan made by the Ministry of Railways with a Franco-Belgian banking group.—*Kuo Min.*

SHIPPING

NEW SINGAPORE PIER.—The Governor of Singapore, in rejecting the Straits Settlements Association's opposition to the name of Clifford Pier being given to the new landing stage at Singapore, explains that there will continue to be landing facilities at the point long known as Johnston's Pier, although the precise nature of the structure has not yet been determined. His Excellency can see no justification for removing Mr. Johnston's name from the site to which it has so long been attached, renaming that site and transferring Mr. Johnston's name to a new pier on a new site, even though the distance between the two sites is small.

ANNAM PORT IMPROVEMENTS.—It is proposed to modernize the ports of Tourane, Vinh-Benthuy, Quinhon and Nathrang. Tourane is the most important port in Annam. It is proposed to construct a large and deep anchorage on the right bank of the river Cam-Lé, so that big ships will no longer have to anchor in the bay. The port will be connected with the town of Tourane and the railway by a bridge over the river. The estimated cost of the work is 5,600,000 piastres. Only coasting vessels use the port of Vinh-Benthuy. Here periodic dredging will be carried out at a cost of 100,000 piastres a year. It is proposed, ultimately, to construct a canal, at a cost of about 10,000,000 piastres. Owing to the expectation of increased traffic at Quinhon, berthing space is to be provided in the lagoon, and the access and anchorage improved. It is also proposed to construct an outer port. To attract ships to French Indo-China, it is intended to make great improvements to the port of Nathrang, including the construction of a dam between one of the islands in the bay and the mainland.

JAPANESE MERGER.—Following the recent amalgamation of three of the biggest paper companies in Japan, negotiations are under way for a merger of the two biggest steamship companies, namely, the Nippon Yusen Kaisha and the Osaka Shosen Kaisha, so as to unify Japan's sea transportation. Keen interest is attached to the outcome of the negotiations.

NEW JAPANESE GUNBOATS.—The Naval Ministry has placed an order with the Kiangnan Docks for two additional gunboats, which are to be duplicates of the newly launched Haining and Kiangning. The new boats will be named the *Fusing* and the *Suining*. Each will be 128 feet long, 20 feet wide, with a draught of 10 feet and a speed of 10 knots per hour. The total cost is estimated at $500,000. It is learnt that these are the first two of ten similar vessels to be constructed for the Ministry.

MINING

COAL IN CHINA.—The unworked coal deposits in the province of Honan, China, are estimated to amount to 1,914,000,000 tons, according to the *Chinese Economic Bulletin*. The coalfields are situated in the North-western mountains in the province named, and transport is a difficulty in exploitation. All the coal is said to be anthracitic, except for some 280,000,000 tons located in four areas. Coal has been reported from two other areas, but the extent of the deposits is unknown.—*The Engineer.*

FIND MINERALS. Mineral deposits have been discovered on Sunchia Shan (mountain), near the northern Kiangsu coast, by workmen of the Lung-Hai Railway while engaged in boring a railway tunnel through the mountain for the eastern extension of the line. The discovery was reported by Mr. Yu Shih-pin, Director of the General Affairs Department of the Railway, recently after returning from an inspection. Although the exact composition of the ore has not yet been ascertained, it is believed to be a rather fine grade of lead deposits. Specimens are being sent to Nanking for chemical analysis.—*Kuo Min.*

AVIATION

PLANES FOR CHINA.—Realizing the inadequacy of China's air force, Honan Province has raised $300,000 through private contributions and has purchased three fighting 'planes for the Chinese Government.

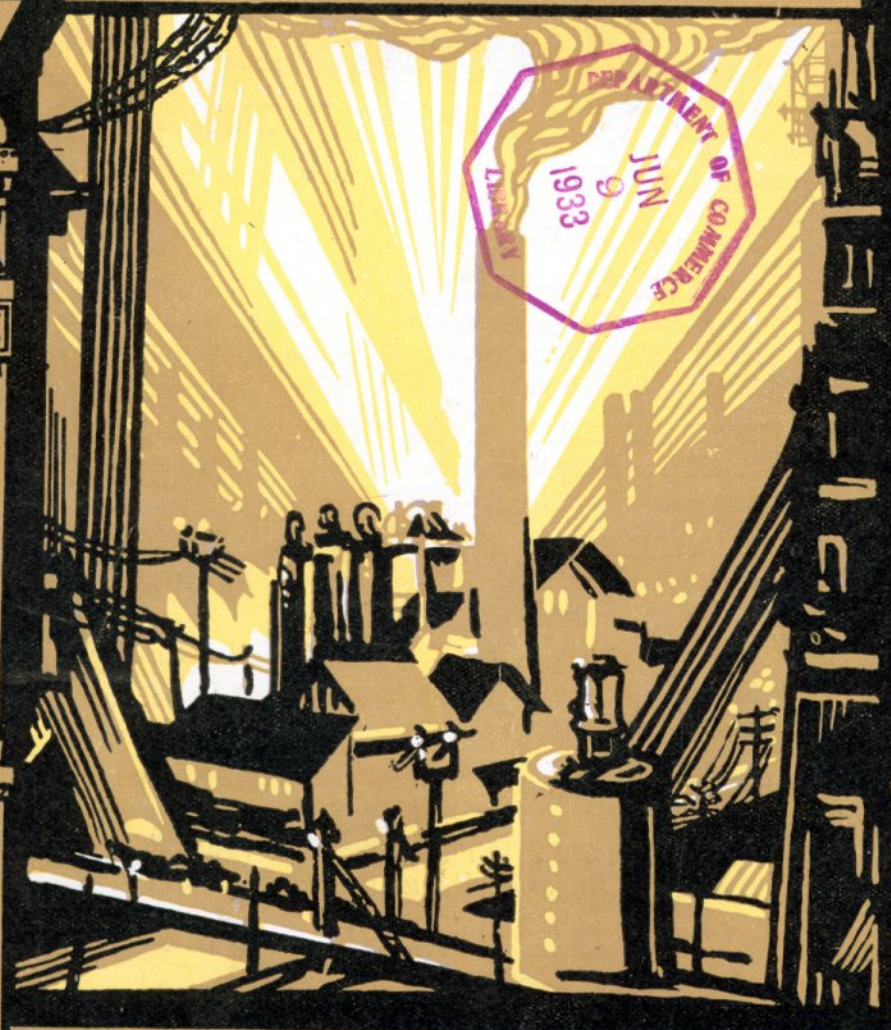
The machines have already arrived in Shanghai, and the Aviation Bureau is sending experts to bring them to Honan first, in order that the Honan public may view their donated machines, after which the 'planes will fly to Nanking to join the regular Air Force.

NEW JAPANESE SERVICE. A regular triangular flight for passengers and freight, connecting Chichibar, Dairen and Heijo will be commenced soon, according to Chief Kodama of the Technical Section of the Aviation Bureau and Chief Ando of the Aviation Affairs Section of the Japan Air Transport Company. According to them, two Super-Universal passenger planes will be used for the time being but several more planes will be operated beginning early next spring. Chief Mugita of the Dairen Office of the company will also take charge of the works of the Mukden Office as its head.

Mr. Okabe of the company is to be appointed as the chief of the Harbin Office. As for the head of the Shingishu Office, the choice has yet to be decided. At present the Japan Air Transport Company is offering its planes to the Army by contract for sending military supplies and for communication purpose.

ENGINEERING FINANCE COMMERCE

THE FAR EASTERN REVIEW



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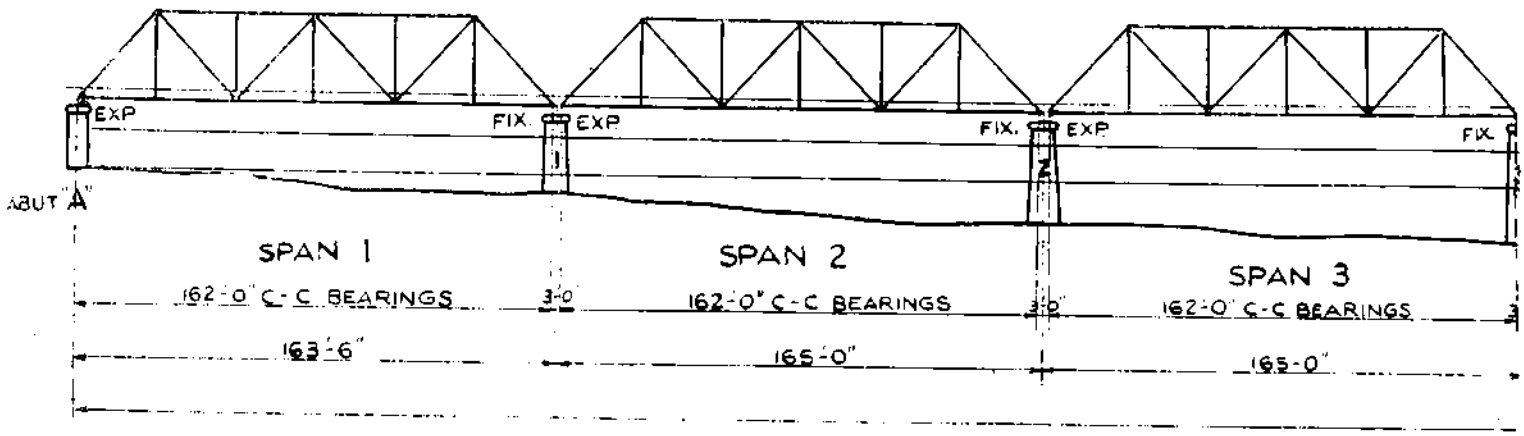


Plan of First Three Spans of the Sunning Railway Bridge

Sunning Railway Bridge at Kung Yik, Kwangtung

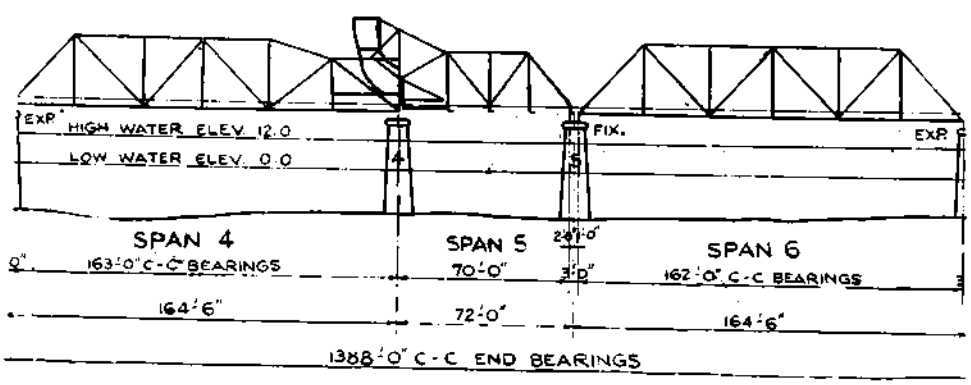
A BRIDGE for the Sunning Railway is now being built by Messrs. McDonnell & Gornuan, Inc., to replace the antiquated car ferry service across the Tam River, which, while serving its purpose admirably in the past, now seriously impairs train service, and is proving an obstacle to much needed line changes and grade elimination schemes.

The present ferry consists of a flat barge capable of taking eight cars and a locomotive with tender, and is operated by four steam winches which pull the entire equipment across the river by means of steel cables. Each trip takes, on the average, about half an hour.

The Sunning Railway serves the four fertile and prosperous districts of Hoi Ping, Sun Wui, Toishan and Hok Shan in Kwangtung Province and is unique in that it has been financed, built and operated entirely by the Chinese. At one time the area traversed by the railway was infested with bandits and pirates and one could hear sporadic rifle or pistol firing at almost any time during the night, even in the populated centers. At present, things are getting into better control and it seems at last that these troubles are gradually subsiding.

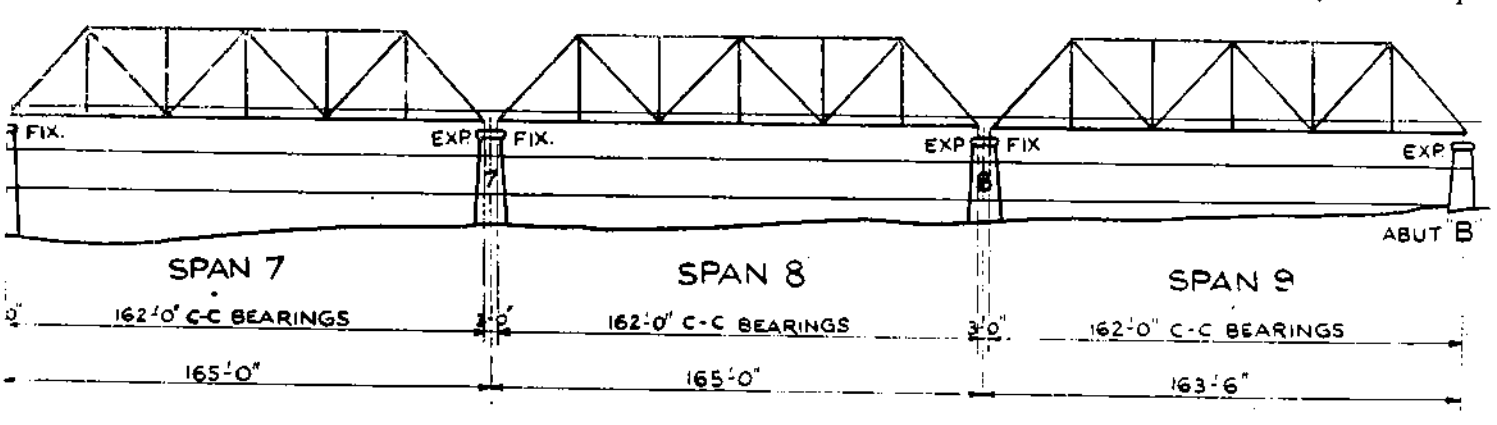
The railway authorities, realizing the inconvenience of the car transfer, and with the idea of competing successfully with river transportation with its low freight rates, have decided to re-locate a considerable part of their line and make several necessary improvements to serve the general public. Construction of the new Tam River bridge constitutes one of the major items in the general scheme of improvement.

The bridge is located at Kung Yik, fifty miles from the steamer terminal at Pak Kai and four miles upstream from the present ferry crossing. The Sunning Railway main line extends from Pak Kai to Toi Shan, a distance of about seventy miles, traversing towns and cities thickly populated and both the passenger and freight traffic are comparatively heavy. On completion of the bridge now under construction, together with other necessary line changes, and grade and curvature eliminations, there is a prospect of the future extension of the line with Macao, the well-known sea port, as its terminus.



Plan of Central Spans of Sunning Railway Bridge showing Bascule Span

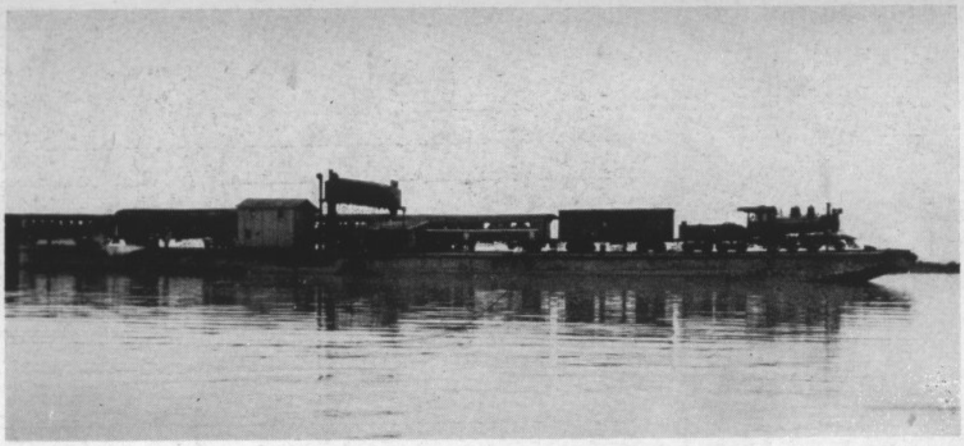
The new Tam River bridge will be fourteen hundred feet long between abutments and consists of seven fixed spans of one hundred and sixty-two feet, one fixed span of one hundred and sixty-three feet, a bascule span of seventy feet and an approach span of sixteen feet. The steel spans will be of the through rivetted Warren type designed for a loading of Cooper's E 35. The width of the bridge is to be about thirty-one feet overall, and it will carry a single track of standard gauge, flanked by five foot sidewalks supported on cantilever brackets on each side. The roadway portion of the bridge, about fifteen feet wide between curbs, will be so paved as to permit



Plan of Last Three Spans of Sunning Railway Bridge

a single lane of highway traffic when trains are not passing.

All the spans are to be of structural steel; the approach span to be provided with concrete stairs leading from the bunding to the bridge floor sidewalks. The steel work is being furnished by the American Bridge Company of New York and the Scherzer Rolling Lift Bridge Company of Chicago. The opening and closing of the bascule will be electrically controlled and will be operated from a signal house on the bridge. Manual power will also be provided in case of power house breakdown resulting in temporary suspension of electric current supply.



Showing Car Ferry at present in Service to be replaced by Sunning Railway Bridge

Abutments and piers, varying in height from twenty-three to fifty feet, are being constructed of reinforced concrete and designed for Cooper's E 50 loading with the object that the superstructure may be renewed at some future date as heavier loading and denser traffic should demand, without the renewal of substructures. Piers and abutments are being founded on rock or such strata as is considered satisfactory to give the requisite bearing.

Substructure construction is being carried out by the cofferdam process. Steel sheet piles, forty-five to sixty-five feet in length, are driven around the pier sites, driving equipment for this work consisting of McKiernan Terry 9B and Vulcan steam hammers. Where conditions permit, cofferdams are unwatered, and excavation made in the dry until the required stratum is reached at a datum previously determined from borings. Steel sheet piling is pulled, when a cofferdam is no longer required, by means of a Demag-Union pile drawer capable of exerting a tensile force of twenty tons.

In case an exceptionally porous strata renders cofferdam dewatering difficult and costly, excavation is first made by a bucket dredge, using Diesel engine power. Cofferdams are then tremie sealed, de-watered, and pier shafts carried up in the dry. Pumping equipment consists of Duplex and centrifugal pumps, varying is size from four up to eight inches.

The steel truss spans are being first erected on falsework parallel to the South shore of the river, an erection traveller being used for this work. All field rivetting is done with the trusses in this position, pneumatic tools being used. When the piers are ready to receive them, the steel spans are raised from the falsework by means of two lighters fitted with special floating equipment, utilizing the tidal range for this purpose. They are then floated to their position on the piers.

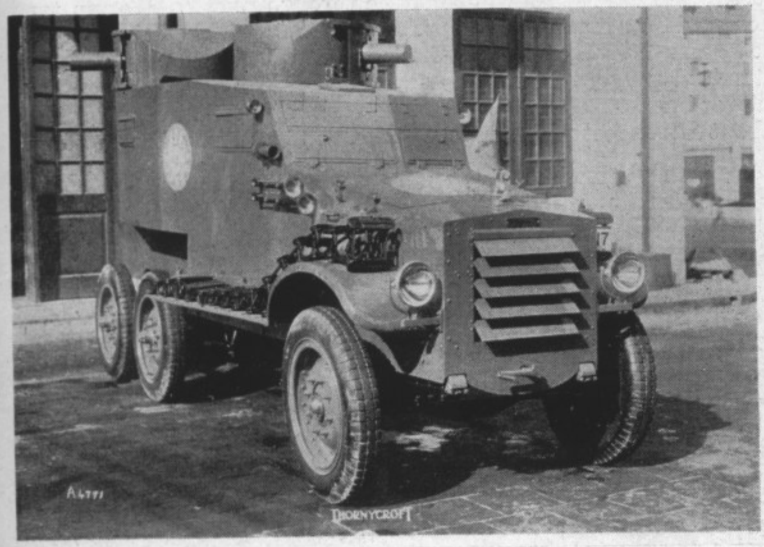
The bascule span will be erected in its open position and the concrete counterweight poured simultaneously to keep the finished portion of the structure in balance. After the installation of the operating equipment, the bascule span will be delicately balanced by counterweight adjustment and will then be ready for service.

As originally planned, the entire bridge deck was to be of hardwood timber, but it has since been decided to use a reinforced concrete deck to give a better roadway, with cheaper maintenance, as well as longer durability.

The ordinary tidal range of the Tam River is about six feet, while the maximum difference between high and low water is about ten and a half feet. The current of the river with wind blowing in the same direction is about five knots per hour, which at times makes the substructure construction rather difficult.

Notwithstanding these difficulties the contractors, McDonnell & Gorman, Inc., are making good progress with the job, which is under the direction of their Resident Engineer, Mr. George C. Brimble. The contract price of the entire structure amounts to about one million and fifty thousand Hongkong dollars, and unless the work is stopped or delayed by unexpected developments beyond the control of the contractors, the bridge will be completed next autumn.

Armored Cars for South China



At the left is shown an armored car recently supplied by Messrs. John I. Thornycroft and Company, Ltd., to the Government authorities at Canton. It is on a Thornycroft type "A3" 3-ton six-wheeled chassis and is part of an order for eight similar vehicles. The picture on the right shows a new type police riot car supplied by Messrs. John I. Thornycroft and Company to the Hongkong Police force.